retro GAMER

BOOK OF

ARCADE CLASSICS

- DISCOVER THE ORIGINS OF ICONIC GAMES
- HOW ARCADES RULED THE WORLD
- AMAZING DEVELOPER INTERVIEWS

Digital Edition

FUTURE

SIXTH EDITION

Welcome to

ARCADE CLASSICS

Walk around an arcade nowadays and you'll find it filled with countless penny pushing games and fruit machines. In the Seventies and Eighties it was a completely different scenario with those machines playing second fiddle to countless arcade games. While home computers were moving at an astonishing rate they still couldn't compete with the incredible games that were being released in the arcades. Companies like Atari, Sega and even Nintendo were pushing specific hardware boards to the limits to create unique gaming experiences, many of which had never been experienced before. It was an insanely exciting time to be a gamer and it seemed like a new mechanic or type of game was appearing every time you visited your local arcade. Sure, many of those games that took your breath away would eventually appear on your own home system, but they were never as good as the originals. With that in mind, we've collated our greatest arcade content so you can relive one of gaming's most significant periods.

In association with retro GAMER magazine

FUTURE

ARCADE CLASSICS

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Printed by William Gibbons, 26 Planetary Road,
Willenhall, West Midlands, WV13 3XT

Distributed by Marketforce, 5 Churchill Place, Canary Wharf, London, E14 5HU
www.marketforce.co.uk Tel: 0203 787 9001

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Retro Gamer Book of Arcade Classics Fifth Edition
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Connectors. Creators. Experience Makers.

Future plc is a public company quoted on the London Stock Exchange (symbol: FUTR)
www.futureplc.com

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Part of the retro GAMER bookazine series

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ARCADE CLASSICS

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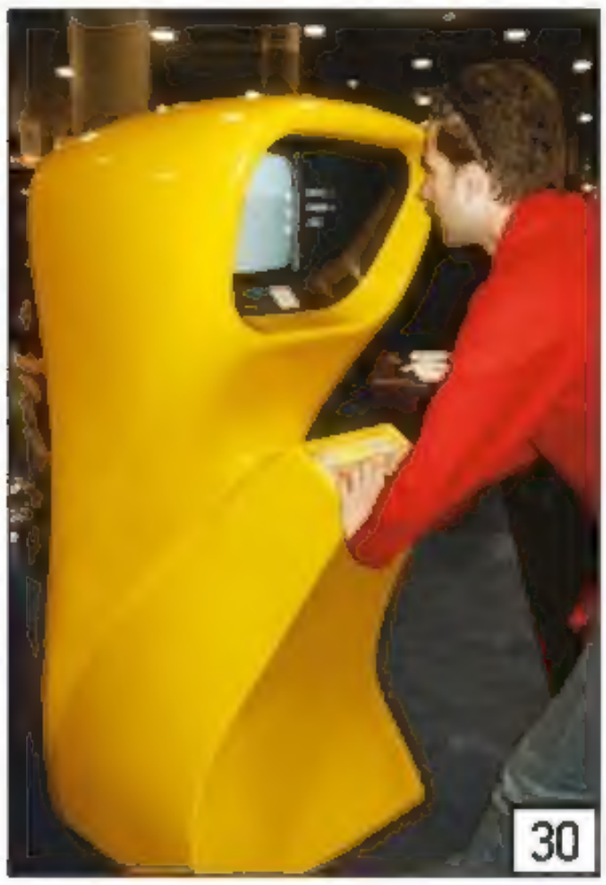

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No matter if you were the first kid on the street with an Atari 2600 or a Spectrum owner marvelling at Bob Pape's conversion of *R-Type*, it's clear that arcade games were the glue that bound the videogame industry together.

As soon as the success of Atari's *Pong* was established, arcade games became one of the key forces driving innovation in hardware and software within the videogame industry. For decades, the arcade was the only place to find truly cutting-edge gaming. Home computer and console games could only play catch-up with conversions.

But it couldn't last forever. Changing player tastes and rapid advances in technology resulted in the swift decline of the arcade business in the 21st Century, but the market never died. From the early pioneers of the arcade business to those still making a living from coin-up gaming today, **Retro Gamer** has spoken to key players from the industry to bring you the history of arcade gaming.

THE 70S

THE GENESIS OF AN INDUSTRY

If you grew up in the Seventies you were there to witness the introduction and proliferation of arcade games. Marty Goldberg takes you on a narrative journey of what it was like

THE SEVENTIES ACTUALLY REPRESENTS AN INTERESTING PERIOD IN TIME FOR VIDEO ARCADE GAMES. ONE OF GROWTH AND PENDING DESTRUCTION. A DECADE THAT WAS SIMULTANEOUSLY A GENERATOR OF CRITICAL MASS FOR THE NEW MEDIUM WHILE ALSO WREAKING TOTAL HAVOK ON THE LONG ESTABLISHED COIN ENTERTAINMENT INDUSTRY.

The seed for this world influencing event had begun in 1969 when two office mates and friends at audio giant Ampex decided to pursue the one's vision of marrying computer technology and arcade gaming. Nolan Bushnell and Ted Dabney started to create a video arcade game based on an earlier computer game the two witnessed at Stanford called *Spacewar!*.

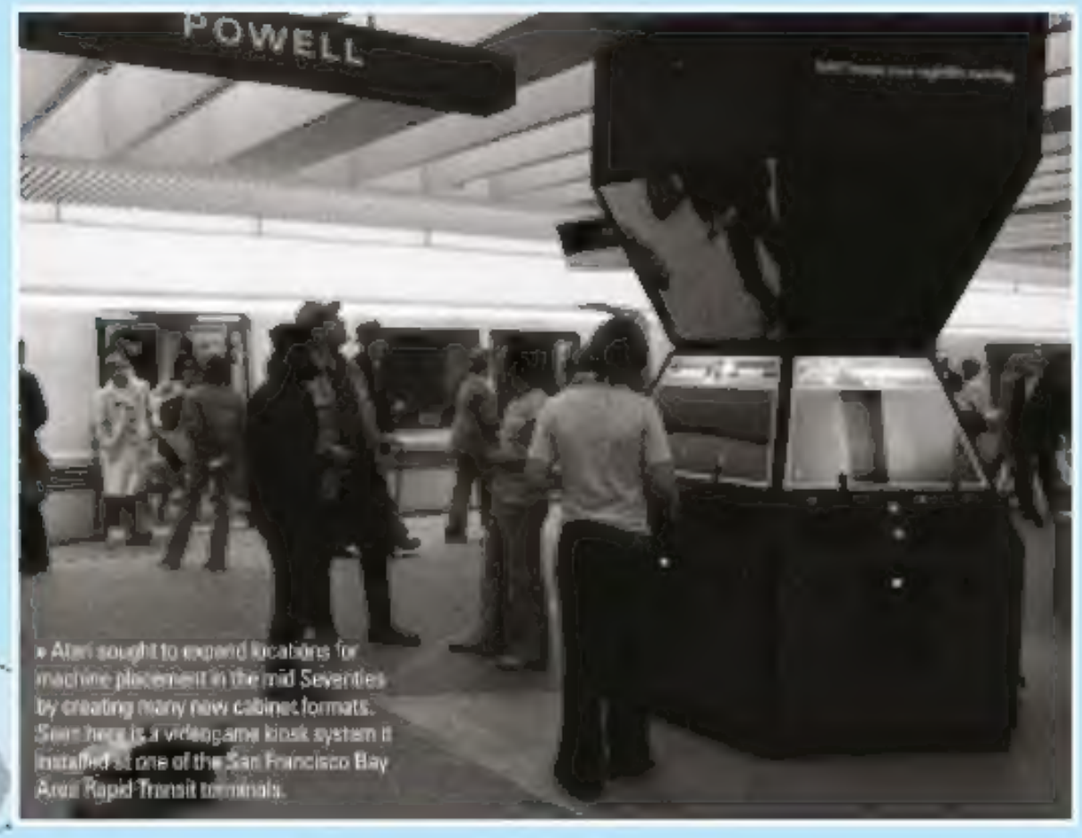
You have to understand what a novel if not naive concept this was, that two guys could come in and create an entirely new entertainment medium let alone to hope that it would gain any traction in the already established coin industry. First, they were out in

» Seen here is the paper tape for storage of code typically used by video arcade game authors in the mid Seventies such as those at Atari.

California. This was a location about as far away from Chicago, the established mecca of the coin industry, as you could possibly be. Second, they'd have to convince an established coin company to take a chance on it. The industry at that time was dominated by companies that had already been around for decades like Williams, Gottlieb, Bally and Chicago Coin.

The games they were pumping out had been mainly pinball and gun based, though over the Sixties more specialised electro-mechanical (EM) games had gained popularity. Games based on simulations whose subjects would become popular as videogames almost a decade later. Ed Logg, creator of such videogame classics as *Asteroids*, *Centipede* and *Gauntlet* remembers his first exposure to these games: "The first time I played a coin-operated game was at the Berkeley Student Union. It was a game where you tried to shoot down bombers which appeared over the horizon. It wasn't a videogame because the planes appeared to be on a rotating piece of screen. There was a pattern so I could play the game for as long as I wanted."

There was also the uphill battle of the stigma arcades had in a lot of communities as a hotbed for raucous teenagers or in some cases organised



» Atari sought to expand locations for machine placement in the mid Seventies by creating many new cabinet formats. Seen here is a videogame kiosk system it installed at one of the San Francisco Bay Area Rapid Transit terminals.

» Al Alcorn's classic *Pong* – still iconic after all these years and an impressive starting point for the industry.

KEY EVENTS

1971

1972

1975

1975

1976

"My earliest memories of arcades were of shadowy places where naughty things might happen"

A. Alcorn

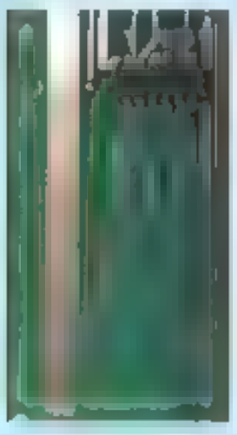
crime and gambling. As *Pong* creator Al Alcorn relates, "My earliest memories of arcades were of shadowy places where naughty things might happen. Besides the usual pinball machines and 'love' testers there were movie machines that showed graphic movies. At Playland at the beach there was the Fascination arcade, which was grey area gambling. These places were not for family entertainment."

Bushnell and Dabney's initial goal was to start a videogame engineering firm, researching and creating games to license to the big coin companies to produce. If you're asking why they were engineering firms, it's because the early arcade videogames were not coded – they didn't have a microprocessor. Rather they were what's called 'state machines', a grouping of electronic circuits that carried out various functions based on the input – in this case the game's controls. You'd have one circuit to put an object on the screen, another to move them, another to detect a hit, and so on.

They lucked out however, and found the one coin-op company based in California, Nutting Associates. Something of an upstart itself, Nutting had been formed by Bill Nutting after creating an EM-based quiz game called *Computer Quiz* with his brother Dave Nutting. Their initial partnership had quickly fizzled and Bill started Nutting Associates in California to sell the game while Dave started Nutting Industries in Milwaukee, Wisconsin to sell his version. Releasing a string of similar games and recently firing most of his engineering staff, Bill was looking for a new game to keep the momentum going. He got the new game in Bushnell and Dabney's proposal plus a new engineer out of the deal as well as Bushnell left Ampex to join Nutting (followed by Ted close to a year later). Bushnell and Ted's deal was for Nutting to license the game for manufacturing but they'd do all development on their own time (working after hours at Nutting and at Ted's house).

By August of 1971 they were testing their prototype at a local college bar called the Dutch Goose to great results. The following month, as Bill Pitts was installing his *Galaxy Game* (which uses an actual full DEC minicomputer running *Spacewar!* code) at the Stanford Student Union they found the results at their subsequent test locations far less promising. It turned out the students at Dutch Goose were mainly students pursuing degrees in engineering, physics, and computers. Stepping out of that comfort zone of technical professionalism meant that the patrons at other locations ▶

» Early arcade games did not use microprocessors or software. Rather they used logic chips, such as this one below.

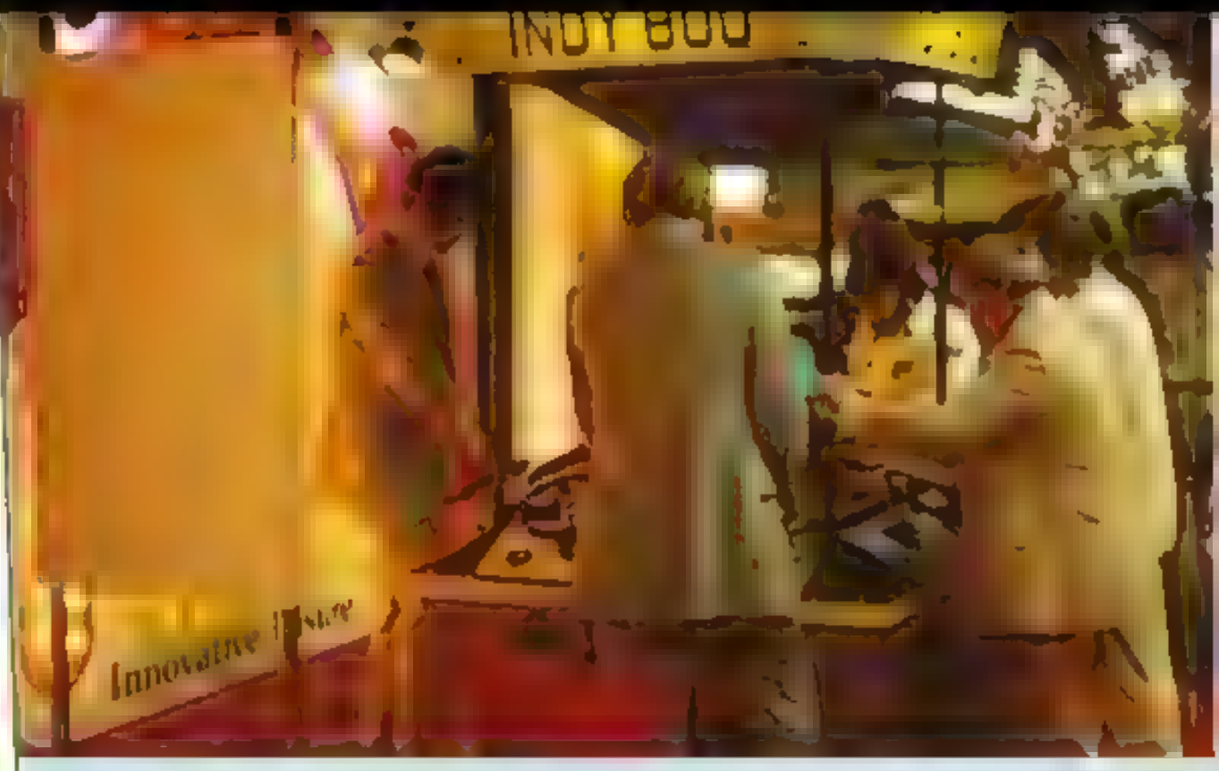


» The exterior of a prototype *Pong* cabinet from the Seventies. This angular design was fairly common.

» Usually a stripped down television, single game board, and a power supply were all that resided inside machines.

DAVID PERRY

"*Moon Cresta*. In it you can stack up your firepower, so you go from weak to strong to weak. I used this idea in games for many years. You'll see it in games like *Earthworm Jim* (weak worm in a strong suit), *Messiah* (weak baby possessing a giant's body) etc. I personally like that gameplay style where you're kicking butt one minute, then very defensive the next."



▶ were entirely confused by the gameplay, controls and overal presentation. In fact this was when the duo learned that presentation across the board was just as important to its success, something the big boys of the coin industry already knew. Bushnell countered with a slick new futuristic design and a somewhat clearer contro scheme. A package that actually caught the attention of everyone when they showed t off in Nutting's booth at the main trade show of the era, the Music Operators of America in Chicago. The automated music industry – jukeboxes – was actually the dominant force in coin-operated entertainment at the time, with arcade games being a subset. By the mid Seventies the show would change it s name to the Amusement and Music Operators of America thanks in no small part to the rising dominance of the coin amusement industry thanks to arcade videogames.

Don't expect the type of astonished hoopla that the Apple II generated during its debut at the West Coast Computer Faire six years later though. The common questions Bushnell and Dabney got were "Isn't this just a novelty?" or "Isn't it expensive to broadcast?" (yes, some thought that because there was a television inside that the picture of the game was being broadcast). Regardless, contrary to some modern retellings of the story, their game (named *Computer Space* by Bill Nutting) went on to sell what is considered a decent average run for an arcade game at the time – enough that the medium was considered viable.

Bushnell and Dabney famously left Nutting the following year to formally start their engineering firm Syzygy Company, only to have it grow into the future industry juggernaut Atari Inc thanks to a game developed by their first engineer, Al Alcorn. *Pong* started off as a starter exercise for Alcorn only to turn into a lesson for the entire coin amusement industry. With simple gameplay and controls, the cabinet developed by Dabney also featured a philosophy he and Nolan had learned during their *Computer Space* days. "Nolan was careful to have *Pong* look very understated so as not to offend women or families. We wanted to stay away from the girly (side art) that were on many pinball machines," states Alcorn. *Pong* is what drove the industry to take notice of the new medium, and a quick expansion as new companies sprung up everywhere with their own versions of the game. Once the big boys jumped on board as well and demand at established coin distributors grew across the globe, arcade space gradually became a fight of old technology and new as owners stocked both and the major companies continued to produce both. In fact for much of the Seventies pinball machines and video arcade machines were neck and neck in popularity and earnings.

race that was understandable, as video arcade games were still in such a primordial state. Every new game was some new feat, especially since they were still being created purely through engineering. Colour came early on, thanks to Atari's Cyan research lab in Grass Valley that developed an alternate full color version of *Gotcha* that Atari released in October 1973. Animated characters were introduced by Ramtek's *Baseball* in 1974 as the industry moved to make more detailed and interesting games beyond simple ball and paddle driven games. 1975 saw the intro of giant

DEVELOPER TOP PICK

JIM BAGLEY

"*Scramble* is my favourite arcade game of all time. A local Spar shop got a sit-down cocktail cabinet of it and ran a competition of who could be the first to complete all the levels. I have many great memories playing *Scramble*, even to this day, and now my girls enjoy playing it too!"

> **"It wasn't a videogame because the planes appeared to be on a rotating piece of screen"**
>
> Ed Logg

ARCADE INITIATION

Though largely unknown to many, Jeff Bell is uniquely experienced to comment on the video arcade game industry. Starting in February 1973 at Atari Inc, he remained in the industry until 2003 when Midway Games shut down what was left of Atari's coin operations after exiting the coin industry in 2001.

When did you first experience videogames and how did you get involved with Atari and video arcade games so early on?

In late 1972 I had just applied for a job at Toys "R" Us and was just about to go into the hospital for health issues when my friend Keith Lafever came over to my house and excitedly said "You've gotta see this! You've gotta come!" So I jumped on the back of his motorcycle and rode up to Sunnyvale Bowl where there was a *Computer Space* – I put the only five dollars I had to my name in that machine. It was my first coin-op videogame, and I said I want to do this (create games)! It was the coolest thing I had ever seen! When I got out of the hospital in November one of my friends, Derek Becker, was working at this place called Syzygy collecting coins out of pinball and videogame machines for them. He told me all about Syzygy and their game *Pong* that was coming up. When I got out of the hospital it turned out all my friends were working there at Syzygy. I went in and met Nolan Bushnell, who gave me a job, but I couldn't start until February when my doctor cleared me. Because I couldn't lift anything I became the third *Pong* inspector.

What jumps out about video arcade games in the Seventies era for you compared to the later decades?

In 1972-74, we had to explain to people what a videogame was. By 1976 that had changed to explaining what a 'coin-op' video game was. By the Eighties we needed to explain what the 'Real Atari' was.

Can you elaborate on the last two statements?

Sure. By the mid Seventies the first impression many people had of videogames came from home game consoles. Whenever somebody discovered that I worked at Atari, they would say something like "Oh yeah! I have one..." and I would feel the need to explain that I worked in 'Coin-Op' that a quarter was required to play. By the Eighties, perhaps as an outgrowth of the Consumer Division's success, we began to refer to ourselves in conversation and on T-shirts as 'Coin-Op – The REAL Atari'. This wasn't well received by the other divisions. I heard that we had been asked to not use the phrase. Today I still respond as I did in the Eighties: "I worked at Coin-Op, the REAL Atari!"

multiplayer games like *Indy 800* and the continuation of the expansion of gaming ideas, including a variety of driving and war games. However, it was one technological advancement in video arcade games that made the biggest splash that year: the addition of microprocessors.

All the major arcade companies had already begun exploring adding microprocessors to pinball machines during 1974, and by early 1975 that had extended into video arcade games. Lead by Cyan at Atari and Dave Nutting Associates (yes, that Dave Nutting!) that was now affiliated with Bally/Midway. Dave Nutting's project – transferring the Taito-licensed *Western Gun* into a microprocessor driven game – was first in November 1975. That was (almost ironically) followed by Atari/Kee's *Quiz Show* quiz game in April 1976 at the same time they were debuting one of the last of their big non-microprocessor games, *Breakout*.

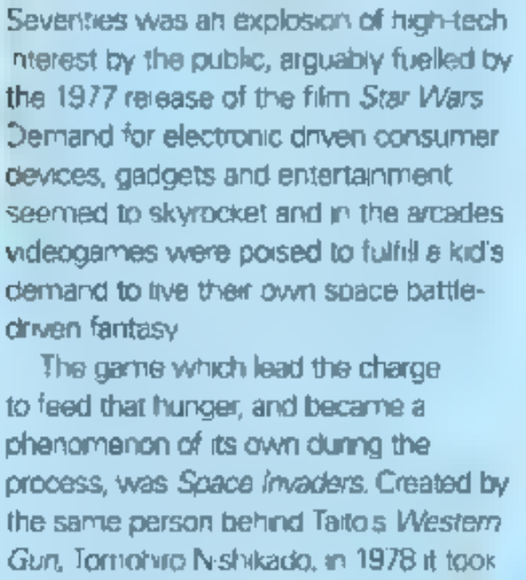
Even with all this advancement of videogames in the coin industry, video arcade games were still just more of a curiosity in the public consciousness. It really wasn't until this mid-Seventies period and the arrival of the inexpensive TV-tennis home game systems like Atari's Home Pong and Magnavox's Odyssey 100 and 200 that public awareness really began to take off. Certainly video arcade games had been making appearances in film and television since the early Seventies (the first well-known one being *Computer Space*'s appearance in 1973's *Soylent Green*). But now with the buzz generated by home games, the appearances in those entertainment mediums became more frequent.

The real growth of video arcade games though, both as the dominant force in the coin industry and as a popular form of entertainment in general, started in the latter part of the Seventies. A result of what was really a perfect storm of reasons, driven by the uniquely timed appearance of a very popular movie combined with a cornucopia of microprocessor driven devices along with some very popular video arcade games being released. From a pop culture perspective, the late Seventies was an explosion of high-tech interest by the public, arguably fuelled by the 1977 release of the film *Star Wars*. Demand for electronic driven consumer devices, gadgets and entertainment seemed to skyrocket and in the arcades videogames were poised to fulfill a kid's demand to live their own space battle-driven fantasy.

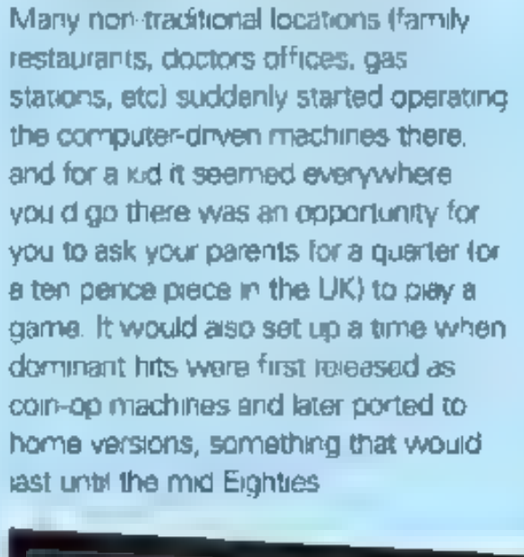
The game which lead the charge to feed that hunger, and became a phenomenon of its own during the process, was *Space Invaders*. Created by the same person behind Taito's *Western Gun*, Tomohiro Nishikado, in 1978 it took Japan by storm and soon after the rest of the world. Games like Exidy's *Star Fire* brought the literal *Star Wars* experience to the arcade, but it was the further extreme popularity of 1979 space shooter games like Namco/Midway's *Galaxian* and Atari's *Asteroids* and their ever increasing game technology that gave a taste of what was in store for the Eighties while providing a thirst for more.

It took eight years for the beginning of the dominance of videogames in the coin industry to come about, however 1979 was really when the demand for the engaging medium skyrocketed. Many non-traditional locations (family restaurants, doctors offices, gas stations, etc) suddenly started operating the computer-driven machines there, and for a kid it seemed everywhere you'd go there was an opportunity for you to ask your parents for a quarter (or a ten pence piece in the UK) to play a game. It would also set up a time when dominant hits were first released as coin-op machines and later ported to home versions, something that would last until the mid-Eighties.

• Electromechanical games predated video games in the arcade, informing the cabinet design of the latter



• Tank's military combat theme would be replicated often in years to come



• The 'Fantasy Forest' arcade room at the original Chuck E Cheese. Nolan Bushnell's attempt at making a family friendly environment for arcade games.

THE 80S

THE GOLDEN AGE OF THE ARCADE

The Eighties produced a multitude of iconic coin-ops. Mike Bevan gains insight from classic developers into the most thrilling of decades to be an arcade gamer

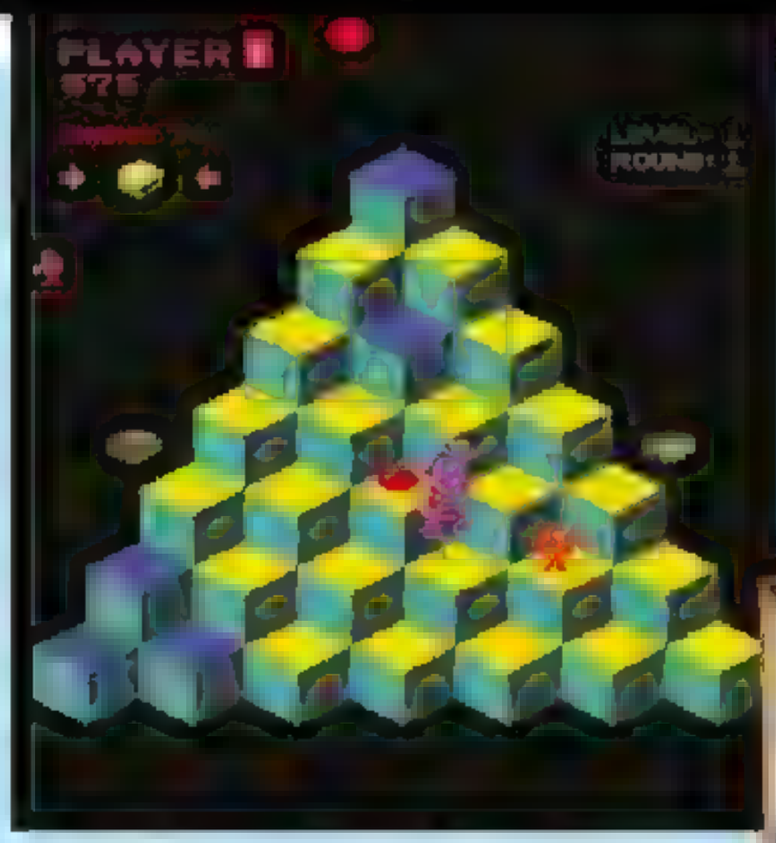
IF THE SEVENTIES HAD BEEN A TIME OF EXPERIMENTAL INVENTION FOR THE ELECTRONIC AMUSEMENT INDUSTRY, THE EIGHTIES WAS THE DECADE IN WHICH IT BLOSSOMED WITH INNOVATION, USHERING IN THE SO-CALLED GOLDEN AGE OF ARCADE GAMES. "It was the time when fully formed videogames first appeared," says celebrated arcade designer Eugene Jarvis. "Going from almost a blank screen to incredibly crafted games unleashed a mania of hundreds of millions of crazed players worldwide that couldn't get enough of these new fangled videos. Since so few videogames had come before, entire new genres were created, sports, character, maze, shooters, fighting, driving games... The excitement of seeing the birth of such a cornucopia of original titles was thrilling to players."

New games were appearing so fast in amusement parlours in the period from 1980 to 1983 that it was hard to keep track of all the goodies – *Battlezone*, *Missile Command*, *Pac-Man*, *Defender*, *Frogger*, *Tempest* and *Donkey Kong* to name just a handful. It was the decade that saw the appearance of the first LaserDisc game, *Dragon's Lair*, spectacular coin-op cabinets like *Spy Hunter*, *Star Wars*, *OutRun* and *Space Harrier*, the first arcade game with 3D polygon graphics, *I, Robot*, and the rise of companies like Capcom and SNK. Behind the burgeoning cabinet rosters of the arcade operators lay an East versus West power struggle between North American and Japanese manufacturers, with the likes of *Space Invaders* publisher Taito, Nintendo, Konami, Namco and Sega competing for floor space with Atari, Williams Electronics, Stern, Bally/Midway and Exidy.

"It was a gold rush," says Exidy programmer Ken Nicholson. "Anything with a screen at a pizza parlour would gobble up quarters. Another factor was the availability and growth of microprocessors. Before the 8080 and 6502, game development was based on much simpler logic. In the early Eighties coin-op games from Japan started to grab the market. At first they were unappealing to US game players for aesthetic reasons but then games from Japan began to dominate the arcade, and they had a price advantage."

"The Japanese developers played a huge role in creating many mega-titles of the era," admits Eugene. "Although videogames originated in the US, as soon as they were popularised, many of the big innovations came from Japan. Different styles of play evolved in the East and West. They were very dominant in character, maze, shooting and driving genres, and were highly influential in the birth of fighting games. Many Japanese developers, strongly influenced by anime culture, emphasised character development, hand-drawn animation and backgrounds, and a more deterministic, scripted, pattern-type play as in *Space Invaders*, *Galaxian* and *Pac-Man*."

"American designs reflected a programmer-centric design culture, emphasising algorithmic generation of backgrounds and enemy dispatch. There was an emphasis on random-event generation, particle-effect explosions and



CLONE WARS

Jeff Minter discusses Eighties arcade tributes

physics in titles such as *Asteroids*, *Space Wars* and *Defender*. The increased emphasis on algorithmic AI, physics and randomness favoured a more improvisational and tactical playing style due to the lack of scripted events. It was a big challenge to be innovative in the face of such revolutionary competition. All Western developers were strongly inspired by the master designs coming from Japan. For example, American games such as *Centipede*, *Q*Bert* and *Robotron 2084* were strongly influenced by Japanese character animation styles."

While the Japanese had the edge with character-based titles like *Pac Man*, *Dig Dug* and *Mr Do*, American designers led the way with engaging and novel action games and shoot 'em-ups such as *Joust*, *Tempest* and *Defender*. "Character and shooter games were the two genres that defined the era," states Eugene. "On the character side, *Pac Man*, *Donkey Kong*, *Q*bert*, *Frogger* and *Mario Bros* set the pace, and in the shooters the defining titles were *Missile Command*, *Defender*, *Berzerk*, *Robotron*, *Galaga*, *Centipede*, *Tempest* and *Zaxxon*, among others."

Williams Electronics was, alongside Atari, arguably the most pioneering of the early Eighties US coin-op publishers. It was one of a number of American companies, including Bally, Stern and Gottlieb, which made the transition from producing mechanical amusements and pinball games to video arcade games. Eugene had started ▶

▸ Gottlieb's *Q*bert* (1982) was one of the most successful US developed character-based arcade games.

TRIP HAWKINS

"*Gauntlet* is my favorite arcade game: in fact I bought my parents an upright *Gauntlet* that they had in their basement for many years. I can still hear the game – "Welcome, Elf!"

using an established template and you know when it's working right. When it's working but doesn't feel like it should then you learn about tuning stuff as you adjust things to make it correct. You learn about hardware limitations and you start maybe learning ways to program around them if you're trying to clone an arcade game that came from hardware more powerful than you are using. And at the end of the day if you weren't too cheeky about it after all that good learning you ended up with a product you could sell.

What's your earliest memory of an arcade?

I'm so ancient my memories of arcades actually go back to before the dawn of time when there were no videogames. When I was five years old our family started what was to be a succession of annual Welsh holidays near Snowdonia. Central to these outings were frequent visits to The Golden Sands on the seafront at Tywyn – a combined chip shop and arcade. No videogames but I remember playing on the grabber machines, penny slot machines, pushers, mechanical horse racing thingies and those driving games that had a rolling form with the track on it and your car was on a stick. The first arcades I used to hang out in with any kind of regularity were the old Piccadilly Arcade up in London, and the Crystal Rooms off Leicester Square. The old Piccadilly Arcade no longer exists as it was underneath where the Trocadero is these days. I can still remember exactly where the *Star Fire* machine was that I put some tasty high scores on.

Why do you think so many developers started off making clones?

Cloning an arcade game was a good way to learn the basic necessary skills of game design and programming. Arcade games are existing designs that you know work so programming them when you're learning teaches you a lot. You learn the basic skills of moving stuff around, reading joystick inputs, making noises and implementing game logic

You've cloned many popular shoot-'em-ups. What do you love about the genre?

I've just always loved shooters. I enjoy the headspace they put you into, the so-called zone state that is always the place I aim to take you to in my games. I particularly enjoyed the look of some of the earlier shooters, again the phrase "abstract beauty" springs to mind. In most games the graphical limitations of old systems just make the games look like shit when viewed through modern eyes but when you look at stuff like the pure glowing vectors of *Asteroids* and *Tempest*, *Gravitar* with its asteroid or many-coloured aliens like little bright jewels against the star studded black, *Defender* where you really could visibly blow things into their component bits like some kind of mathematical deconstruction firework display, the absolutely perfect balance of beauty and brutality that is *Robotron*. Those things are still beautiful now, but back then, when only a few years previously the whole idea of games involved cards or boards or sports you were outside at best, or you didn't have 3D vision, the opportunity to step into and dance within these exquisite glowing other-dimensional worlds was something extraordinary and wonderful. It's that feeling that I want to try to convey to people today with the kind of stuff I make.

Your own games improve on the arcade originals, why do you do this?

I think it's just a natural progression when I started the first things I did were stuff like *Centipede* and *Space Invaders* on the ZX81 and *Defender* on the VIC-20 and then Atari started getting less tolerant of people doing clones and wanted to do a *Centipede* style game on the VIC anyway, so perforce had to make it not so obviously *Centipede*-ish and ended up making something that I actually liked more than vanilla *Centipede*. Learning that it's okay to colour outside the lines is an important part of anything really. Scrolling shooter suddenly didn't have to mean *Defender* or *Scramble*, why not camels or sheep? These days

KEY EVENTS

1980

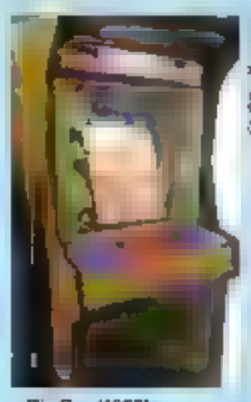
out programming sound and gameplay features in pinball games for Atari and Williams, and this early industry experience was to become a huge influence in the creation of his arcade titles, *Defender* and *Robotron 2084*.

"Pinball was a great training ground," he tells us. "Audio was especially important in pins because there is so much dead time where the ball is rolling around the playfield, not hitting any targets. Background sounds were used to generate increased tension and excitement as a game approached a climactic event. My pinball sound work lead to the creation of many of the amazing synthesised sounds for *Defender*, *Robotron* and other games in the classic era at Williams." The format of the traditional pinball table was also a source of inspiration for other game manufacturers. Games such as *Breakout* and *Space Invaders* adopted the basic human versus machine pinball game style – three balls (or lives) per game, and the ability to win an extra ball (life) with a high scoring achievement," Eugene explains. So it was a natural transition to move from pinball to video."

Defender's dazzling, pyrotechnic visuals and blistering sound effect took arcades by storm, and its free-flowing, multi-directional gameplay represented a huge step up from Konami's *Scramble* released a year earlier. The aural delights of Williams arcade games became a signature of Eighties arcades, along with *Pac-Man*'s distinctive wakka-wakka, *Berzerk*'s robotic speech and the jingles and digitised movie quotes from Atari's *Star Wars* cabinet. Williams also had one of the first two-player cooperative arcade titles with surreal physics-based flap-em-up *Joust*. "This was one of the first ideas I had on the game," says designer John Newcomer. "If it could be designed for two players to compete or cooperate simultaneously, it meant two coins would go in the machine at the same time.

Coin-op games at the time were all single-player, except *Wizard Of Wor* and *Space Wars*, which was a dead game by this point. My hope was that *Joust* would be a step towards making two-player take off in subsequent games. Unfortunately, people did not go for the two-player feature. It helped the cash box a bit, but the vast majority of plays were still single-player." But while *Joust* was the exception to the norm in 1982, it paved the way for later Eighties multiplayer coin-ops like *Gauntlet*, *Bubble Bobble*, *Salamander* and *Double Dragon*.

» *R-Type* (1987) is one of several classic Eighties shoot-'em-ups including *Gradius*, *Salamander* and the in-your-face monstrosity *Darius*.



» *Dig Dug* (1982), a tunnelling action game from *Pac-Man* manufacturer Namco.

» Bally/Midway gave players the chance to live [illegible] in *Spy Hunter* (1983).

DEVELOPER TOP PICK

DAVID BRABEN

"My favourite arcade game was the excellent Williams *Defender*, written by Eugene Jarvis in 6502 machine code. I loved the challenge of the game, and for me was the first game I saw in the arcades that wasn't a *Space Invaders* derivative, and was in colour (ie not stick-on strips on the TV screen like *Space Invaders*)."

» *I, Robot* (1983), the first polygon arcade title, from *Missile Command* and *Tempest* designer Dave Theurer.

1981

1983

1986

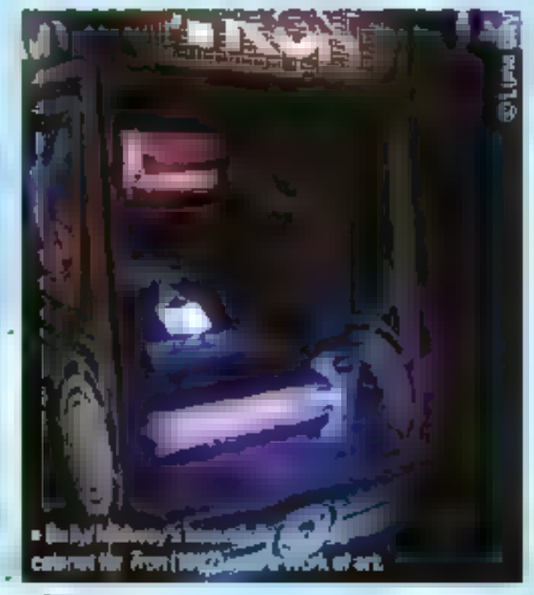
1989

Designer of *Q*bert* Warren Davis remembers, "I [illegible] played games in bars more than in arcades, and you would know what games the bar had. So when you went back and they had a new game, it was a big deal. You'd check it out, maybe watch other people play and then decide if you wanted to risk one of your own quarters on it.

"Williams seemed to have the most intense game experiences. I wasn't particularly a fan, but I admired the skill a person had to have to master their games. My favorite Williams game was probably *Joust*. Who knew I would later get to program *Joust 2*? I liked *Dig Dug* and the *Star Wars* vector game from Atari. *Berzerk* from Stern, *Pac Man* and *Tron* from Bally/Midway. I always thought Williams pushed the envelope

"I always thought Williams pushed the envelope in terms of graphics with Joust and Sinistar"

Warren Davis



» Bally/Midway's [illegible] cabinet for *Tron* (1982) [illegible] work of art.

» *Tiny Double Dragon* [illegible] along with *Final Fight* and *Golden Axe*, were defining scrolling beat-'em-up

and *Tempest*," says Ed. "There is a case to be made that the Vector Generator hardware allowed for decent 3D for the first time. I also think that, at the other end of the Eighties, the polygon hardware that was first used in *Hard Drivin'* and *STUN Runner* also helped keep Atari as a player in the arcade game business."

"The mix of people was key to the way it all developed," says ex-Atari designer Peter Lipson, producer of the *Indiana Jones And The Temple of Doom* coin-op. "So many people had excellent design skills, and the way we were mixed at work led to a lot of innovation but even more importantly, to a lot of refinement of ideas. Your co-workers had no trouble telling you when something sucked. But when you saw them flocking to your game in the lab during their break times, you knew you had something.

"Another thing people have forgotten is that arcades used to be somewhere you could go with your date just to see what new game might have shown up. I think the era of the fighting games made the arcades far less female-friendly. Not that women haven't always been players, but the casual audience seemed to be put off by the change in aura. After that it seemed games couldn't succeed just by being quirky and fresh. We were entering the equivalent of Hollywood's blockbuster era."

DEVELOPER TOP PICK

JOHN ROMERO

"Absolutely, for me, *Pac-Man* changed everything. Most arcade games before *Pac-Man* were all black-and-white alien-killing games. *Pac Man* emerged with a completely unique premise: run away from cute monsters while eating dots. No violence, no guns, and a window into the possibility space of game design."

in terms of graphics with games like *Joust* and *Sinistar*, while Nintendo had the best use of cartoony characters in their games."

"Personally I enjoyed games from most of our competitors," admits Ed Rotberg, creator of Atari's *Battlezone*, the first coin-op title to allow players full freedom of movement in a 3D landscape. "Certainly Williams was at the top of the list with Eugene's games like *Stargate*, *Defender* and *Robotron*. Tim Skelly, whether at Cinematronics or Gottlieb (*Rip Off*, *Star Castle*, *Reactor*) was constantly earning my respect. Of course, the Japanese manufacturers had some great products as well. *Pac-Man* and *Galaga* took up a lot of my time and money."

Atari continued to break new ground through the Eighties, improving its vector graphic hardware to include colour for titles like *Star Wars*, *Tempest* and *Black Widow*, and becoming one of the first companies to produce true 3D arcade games, starting with 1984's enigmatic *I, Robot*. "Certainly the Vector Generator (followed by the colour VG) allowed for such games as *Asteroids*, *Battlezone*

MARIO MAN

Alex Crowley talks to Retro Gamer about his Nintendo collection

What made you consider amassing such a vast collection of Nintendo arcade machines?

Preservation – it is essential to hold on to this social history of arcade machines because it is quickly being forgotten about. Also, because arcade machines are so big most collectors only choose the best games for their collection. But I took it on myself to concentrate on Nintendo and that meant taking on and restoring some of the less well-known titles, which I am really proud of as it turns out to be quite a unique and rare collection.

How did you go about it initially?

My first arcade machine was *Space Invaders Part II* and that was bought on eBay. From there I joined the arcade forums KLOV, AC & Jamma+ – it has opened the doors to a community of fellow collectors where I have imported machines from the US and found rarities amongst UK collectors and made some very good friends.

In your opinion, what are the highlights of your collection?

The highlights in my collection are *Donkey Kong 3* and *Space Launcher*. *Donkey Kong 3* was a kit that I managed to find in its original box complete for just $160 – then converted a versus upright cab which I bought from *Missile Command* champion Tony Temple and turned it into the underrated game I love to play today. It turned out to be my favourite game in my collection. *Space Launcher* – apart from being a great game – is a highlight because it's the only known example to exist in the world amongst the community.

What do you think that the arcade market lost following Nintendo's departure to home consoles?

Well, to be honest until *Donkey Kong* came along they were copying a lot of other more successful arcade developers. But I think once *Donkey Kong* dominated the world it changed Nintendo forever. By 1984 arcades were dying out anyway, so it was natural for Nintendo and other manufacturers to pursue the home market. Arcades were never the same after the Eighties kids grew up, but the arcade games didn't.

***Mario Kart Arcade GP DX* was released recently in arcades. What are your thoughts on other companies taking Nintendo's property to market?**

I think it's a great idea and anyway, Sega made games and distributed them for Nintendo back in the late Seventies. I think Nintendo has to let go of some of its top titles to third parties to help out with their huge and fantastic back catalogue of games.

How do you think arcades have changed since the early days?

They have changed in the sense that kids no longer go there to see the latest games and ultimate new graphics. The technology was new and exciting when we were kids, the machines always had new experiences and innovative ways to play a new game with synthesized speech, trackballs and extra buttons, these were magical light boxes and it was an amazing time to be a kid.

THE 90s

THE DECADE OF RIVALRIES

Nick Thorpe revisits the arcade's final decade of dominance, when players took to fighting and manufacturers battled over technology

WHILE THE NINETIES WOULD PROVE TO BE A TIME OF GREAT CHANGE IN THE ARCADE INDUSTRY, YOU WOULDN'T KNOW IT TO LOOK AT THE EARLY YEARS OF THE DECADE. Scrolling beat-'em-ups, popularised in the Eighties, continued to prove popular with audiences. Konami delivered a string of licensed hits, from *The Simpsons* to *X-Men*. Taito was still introducing new *Space Invaders* games to market, with *Super Space Invaders '91* making its debut. At Williams Electronics, a young Mark Turmell was working to revive an Eighties hit. "I joined Williams Electronics with the sole purpose of reviving the dual-stick control, and told them so during my interview process," remembers Mark, who was as thrilled by the power of arcade hardware as the players. "I had been doing Atari VCS cartridge-based games, where you only had a few sprites that could be on the screen, so this was an amazing advance for me. In the first few days I kept turning on more and more objects on the screen drifting toward the player, and was mesmerized by the power." *Smash TV* was a game that typified the arcade experience, with fast action, amazing amounts of carnage and huge bosses. However, it wasn't the success that its developers had hoped for. "*Smash TV* won some arcade awards, and had decent success at that level, but it was still a disappointment to me in terms of sales and cash box collections," confides Mark. While Mark would eventually go on to huge success with *NBA Jam* a few years later, *Smash TV*'s situation was one that was mirrored across the industry – a quick look at the arcade releases of 1990 will show you a lot of good games, but solid releases rather than enormous hits. Even the likes of Sega's *G-Loc*, housed in the awesome fully rotating R360 cabinet, were old experiences dressed up with new hardware.

But the first signs that the winds of change were blowing came with the first enormous hit of the decade. The original *Street Fighter* had done reasonable business for Capcom in the Eighties, but the arrival of its sequel in 1991 quickly relegated it to a mere footnote in the history books. *Street Fighter II*'s colourful cast of international martial artists and sublime gameplay quickly endeared it to millions of gamers worldwide. The game would prove responsible for the rise of the one-on-one fighting genre, and is often credited with renewing interest in arcade games during the early part of the decade. Previous arcade games had often focused on co-operative play or indirect competition for high scores, but *Street*

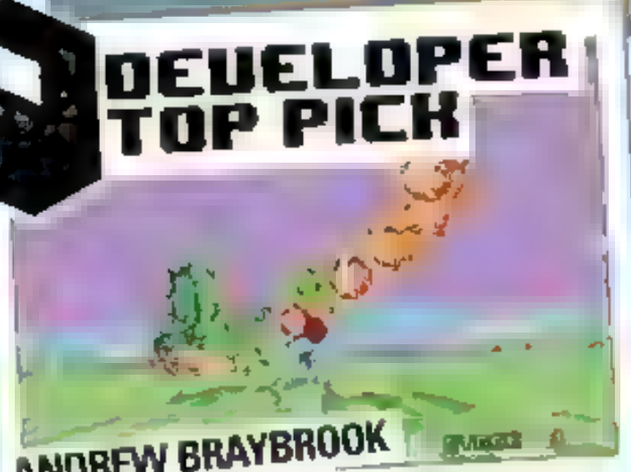
DEPARTMENT OF JUSTICE
FEDERAL BUREAU OF INVESTIGATION

"WINNERS DON'T USE DRUGS"

William S. Sessions, Director, FBI

■ No matter what game you were playing in the Nineties, there was a good chance that you'd see this screen appear

DEVELOPER TOP PICK



ANDREW BRAYBROOK

"We were lucky to be growing up just as arcade games started appearing, so they had a big influence on us. Today my favourite might be *Space Harrier* as it was the first game I played with a moving platform. The music was dynamic and I loved the dragon-riding bonus sections."

"I joined Williams with the purpose of reviving the dual-stick control"

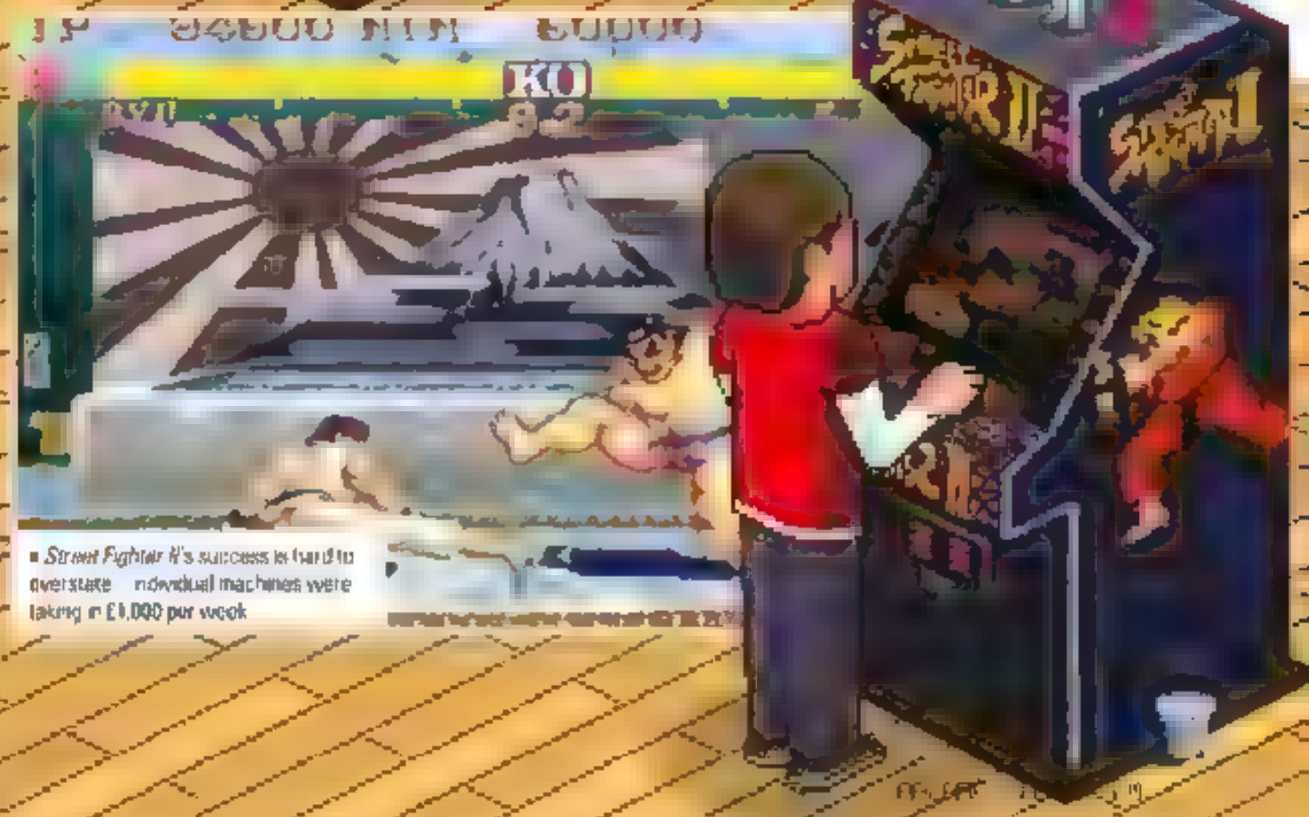
Mark Turmell

Fighter II's key appeal was in standing next to your opponent as you bested them, a factor which paved the way for both the game and the wider genre to become popular in tournament play. Later in 1991 SNK released *Fatal Fury*, a one-on-one fighting game directed by Takashi Nishiyama, a former Capcom employee who had served as the director of the original *Street Fighter*. As the two companies became increasingly prolific in the genre, a rivalry developed which would last for the remainder of the decade.

As well as providing a business boost, the beat-'em-up sensation produced controversy. While the likes of *Street Fighter II* and *Fatal Fury* had been violent, they were never gory. *Mortal Kombat* quickly changed that. Though it wasn't the first game to feature sprites digitised from human actors – they were introduced in the early Eighties and popularised by *Pit Fighter* in 1990 – the combination of the graphical approach with a high level of violence and gore caused a major moral panic in the way that the cartoonish likes of *Time Killers* never could. *Mortal Kombat* would go on to be one of the key titles in the 1993 US Senate hearings on videogame violence, though largely due to its appearance on home consoles. However the Amusement and Music Operator's Association was represented at the hearings and, along with the American Amusement Machine Association, created a parental advisory system the following year. This didn't stop the release of *Mortal Kombat II*, nor other gory fighters that appeared in 1994 such as *Bloodstorm* and *Killer Instinct*, but applied a colour-coded rating to the cabinet for all to see.

Around this time, the demise of an old technology became apparent. Laserdisc ▶

■ *Mortal Kombat*'s violence caused a moral panic in the US



■ *Street Fighter II*'s success is hard to overstate – individual machines were taking in £1,000 per week

90s

• Namco's *Starblade* provides a key example of how rapidly polygon technology developed – it's only two years older than *Ridge Racer*

games, which had set new graphical standards when introduced in the Eighties, still seemed to be strong in the early Nineties. American Laser Games released *Mad Dog McCree* in 1990, and in 1991 Sega brought *Time Traveler* to market in an innovative cabinet which used a mirror to create the illusion of holographic projection. But by 1994, the final Laserdisc games had left the production lines, including Atari Games's *Cops* and American Laser Games's *Fast Draw Showdown*.

But while old technologies fell by the wayside, others rose to prominence. Polygonal 3D games began to hit their stride in the early Nineties – while they had existed since the Eighties, the arrival of Sega's *Virtua Racing* in 1992 would kick off a technological arms race. The game's high polygon count was achieved with the Model 1 arcade board, a joint development with General Electric Aerospace. The board would only host another five games, including *Star Wars Arcade* and the original *Virtua Fighter*, as Sega had its sights set on the next big advance – but crucially, so did Namco. The company introduced the System 22 board in 1993 with *Ridge Racer*, the first ever 3D racing game to employ texture mapping, which enabled a greatly enhanced sense of realism over the flat coloured polygons that had gone before. Sega shot back with *Daytona USA* on Model 2 just months later. But while

DEVELOPER TOP PICK

JON RITMAN

"That's easy: *Battlezone*, and as soon as I started writing this I played it for 15 minutes. At one time in my life my place was party central and inevitably hunger would set in and someone would be sent to the local burger joint, not such a bad thing as there they had a *Battlezone* machine."

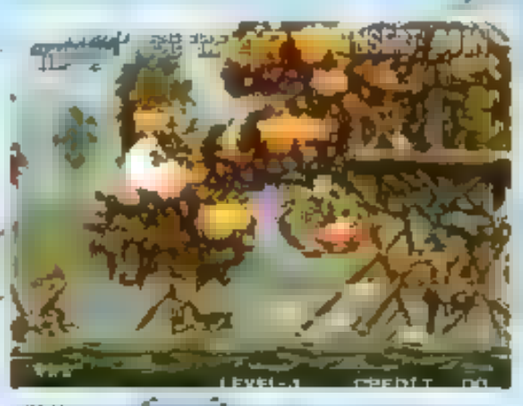
"I kept turning on more and more objects on the screen, and was mesmerised by the power"

Mark Turmell

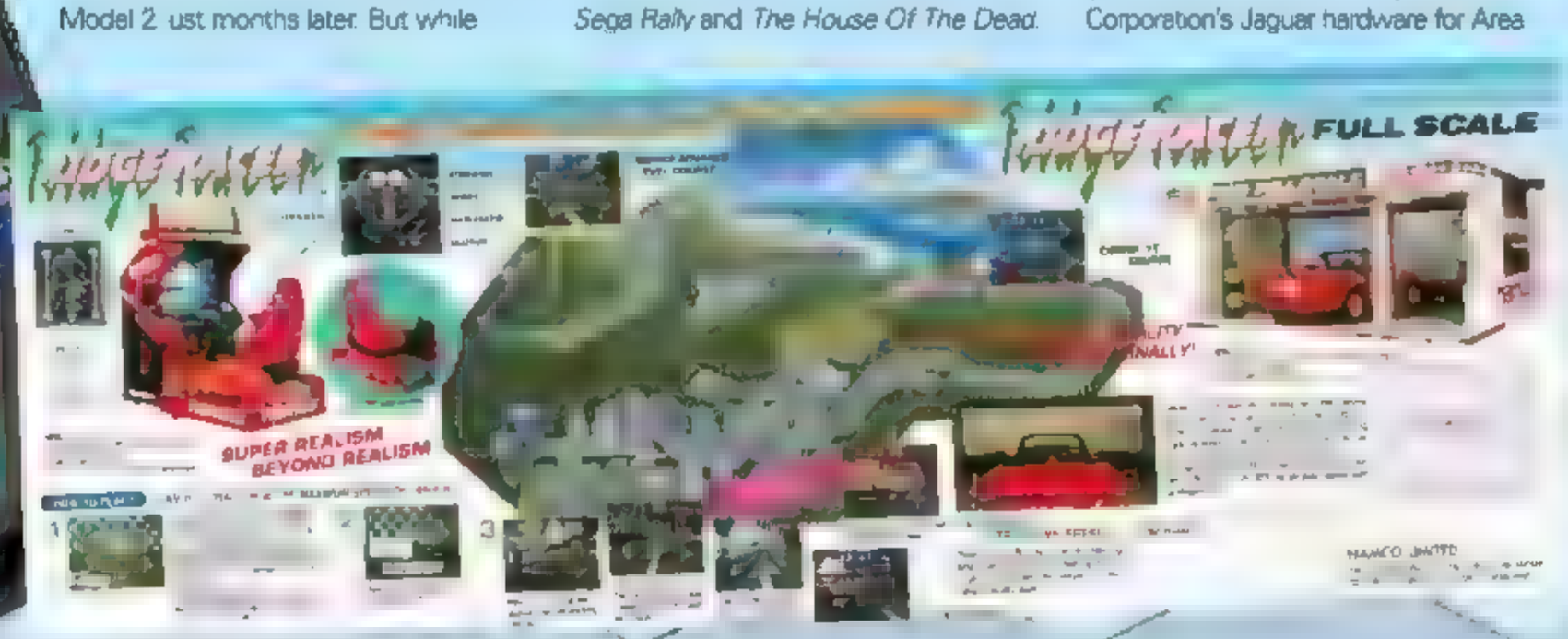
3D games were becoming increasingly popular, they were very expensive for developers as well as operators, ensuring that 3D games didn't become the dominant force in the industry for some time. Indeed, huge film properties like *Jurassic Park* were still being given sprite-based treatments. But by 1996, both Sega and Namco had transitioned to releasing 3D games, having learned to exploit their boards to the fullest. The rivalry between the two companies produced some of the biggest hits of the decade – Namco's System Super 22 was the technology behind *Time Crisis*, *Prop Cycle* and *Alpine Racer*, while Sega's Model 2 series ran *Virtua Cop*, *Sega Rally* and *The House Of The Dead*.

While this was going on, home consoles were rapidly catching up to arcade technology. Namco's PlayStation conversion of *Ridge Racer* wasn't arcade perfect, but it was close enough not to matter greatly – a fact which opened the arcades up to boards based on home console hardware as a budget option. The lower power didn't necessarily equate to a lower profile, though. Namco's PlayStation-based System 12 board hosted the likes of *Tekken*, while Sega's Saturn-based ST-V gave us *Die Hard Arcade*. Atari Games even got in on the act by licensing the Atari Corporation's Jaguar hardware for Area 51 and *Maximum Force*.

These cheaper boards were very attractive to developers too – particularly those who weren't able to stump up the research and development budget needed to take on Sega and Namco. Manufacturers like Konami and Atari Games were still producing custom high-end boards to power releases such as *GTI Club* and *San Francisco Rush*, but others such as Capcom and Taito simply relied on their own PlayStation variants for their 3D releases. Other developers didn't make the leap at all. Irem left the arcade market behind in 1994 due to poor sales, followed by Data East in 1996. SNK found the transition to 3D difficult after relying on the 2D power of the Neo Geo for so long – when the Hyper Neo Geo 64 arrived in 1997 it was expensive and behind the curve graphically, causing it to die a premature death.



• SNK was one of the last companies on the 3D bandwagon, marketing games like *Metal Slug* instead



It wasn't just the developers struggling to keep up. The pace at which technology was advancing meant that operators needed to invest heavily in new machines to stay relevant in the Nineties. Additionally, major attractions had become important to operators, but they came with a price. Dedicated cabinets with unique control methods like *Prop Cycle*, *Wave Runners* and *Rapid River* were great for drawing customers, but couldn't be upgraded with new kits like lightgun or racing cabinets could, leading to stagnating line-ups later down the line. Inevitably, these costs were passed on to players – the price of a credit would creep up over the course of the decade before settling around £1 for new releases.

It's ironic then that one of the great trends of late Nineties arcade gaming began with a small cabinet with low graphical power – *Beatmania*. Konami's 1997 release saw players spinning a turntable and hitting buttons on a keypad to match the notes dropping down the screen – a simple concept, but one which hooked thousands of gamers and has seen over 40 arcade releases to date. Konami, realising that it had a hit on its hands, quickly broadened the concept beyond the DJ simulator to other music-based games, introducing the similarly prolific *Dance Dance Revolution* in 1998 then *Guitar Freaks* and *DrumMania* in 1999. Other developers were taking notice, too – by 1999 Sega had given us the maraca-shaking favourite *Samba De Amigo*, Namco had introduced the *Taiko No Tatsujin* drumming series and Andamiro had introduced *Pump It Up*, a dancing series to rival Konami's *Dance Dance Revolution*. These games would initially become popular in Japan, but some canny localisation saw *Dance Dance Revolution* become a worldwide hit (albeit under the name *Dancing Stage* in Europe).

▲ *NBA Jam*'s success was enormous, prompting Midway to expand the formula to other sports with games like *NFL Blitz*. It didn't always work.

While music games were ascending, other genres didn't fare so well. Despite the high quality of releases like *Spikeout*, scrolling beat-'em-ups were hard to come by towards the end of the Nineties, in part due to the difficulties faced by developers during the transition to 3D. Traditional shoot-'em-ups had also largely been confined to Japan, whether 2D or 3D. The advances in console technology meant that players were concentrating on the games which they couldn't get at home – and operators responded with their purchases, a fact reflected in the hits of the era. While the likes of *Crazy Taxi* and *Hydro Thunder* might have received excellent home conversions later on, it was hard to beat having a steering wheel and pedals.

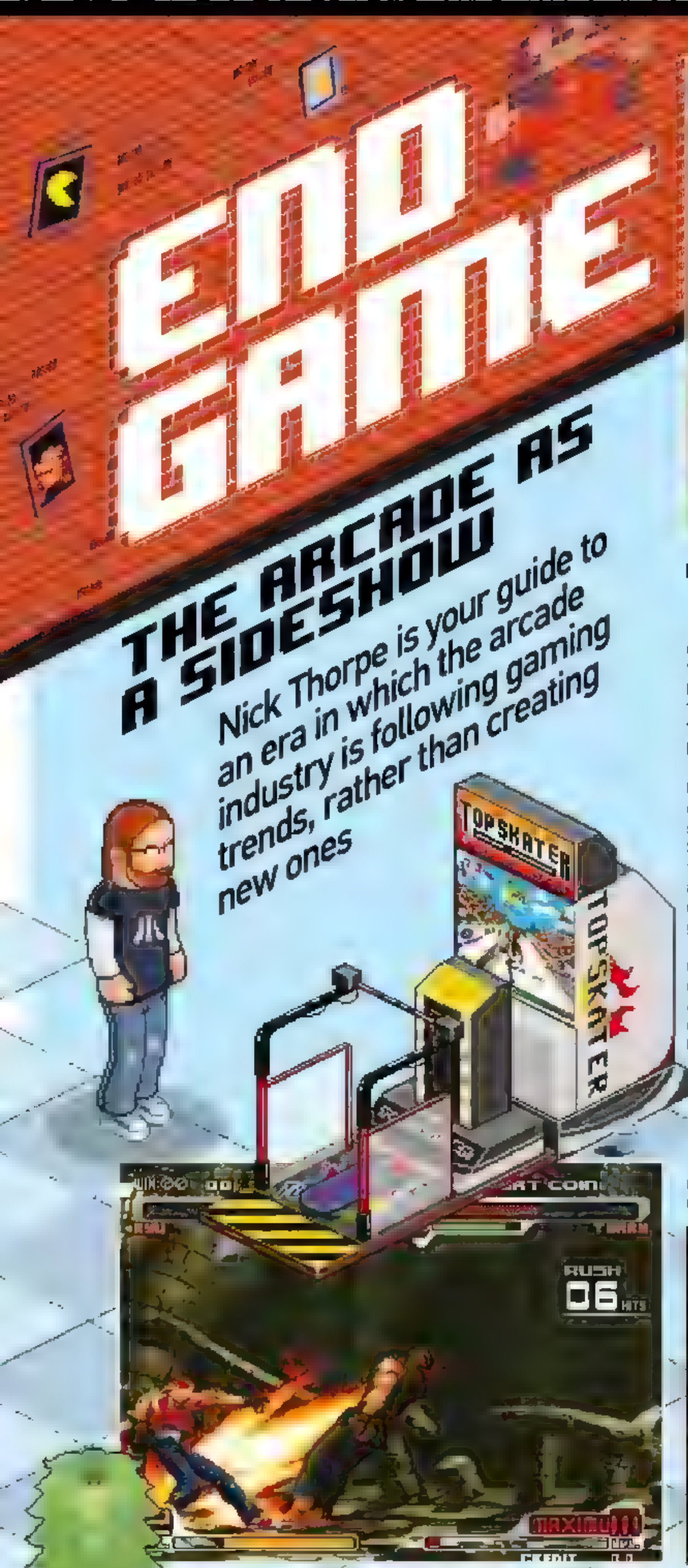
By the end of the Nineties, arcades had lost their edge over mass-market home consoles, some major companies had fallen by the wayside and operators were feeling the pinch. But with the music game boom buoying the industry and hits still arriving in other genres, the outlook for the new millennium was good. Of course over a decade on, we know better – which brings us to the concluding part of our arcade history...

▲ *Time Crisis* ran on Namco's System Super 22.

MELODY MAKERS

THE ARCADE AS A SIDESHOW

Nick Thorpe is your guide to an era in which the arcade industry is following gaming trends, rather than creating new ones



THE STRENGTH OF ARCADE GAMES HAS ALWAYS BEEN THEIR ABILITY TO OFFER ENTERTAINMENT THAT YOU CAN'T REPLICATE AT HOME – BUT AROUND THE TURN OF THE MILLENNIUM, THE TECHNOLOGICAL BOUNDARIES BEGAN TO CHANGE.

Sega's primary arcade board was the NAOMI, essentially an arcade version of the Dreamcast, while Namco slowly shifted towards the PlayStation 2-based System 246. For the first time ever, the technology at the top of both home and arcade markets was the same, and dedicated arcades struggled as hardcore gamers looked elsewhere.

The number of arcades operating in the USA had slumped from 10,000 during the Nineties boom to just 3,000. As business conditions worsened, companies began to exit the market. Midway closed its arcade operations in the early part of the decade in order to concentrate on the home market, taking with it the recently absorbed Atari Games. In Japan, SNK's failing finances allowed it to be bought by Aruze, a pachinko manufacturer that stripped the Neo Geo manufacturer's assets and allowed it to become bankrupt. But while these companies disappeared, it's notable that new ones sprang up to replace them. "Sometimes you feel like a total dinosaur stuck in a time warp," says Eugene Jarvis, who founded Raw Thrills in 2001. "But then you go to an arcade and tap into the enthusiasm of the kids and you get massively jazzed about your next project." Meanwhile, SNK's intellectual property was quickly bought back by Playmore, a new company formed by SNK founder Eikichi Kawasaki that quickly entered the arcade market – though still reliant on the ageing Neo Geo hardware.

In an effort to retain the hardcore players, arcade manufacturers began to implement new hardware features. *Virtua Fighter 4* popularised the use of memory cards, which allowed players to track their wins and losses as well as customising their characters. Memory cards quickly proliferated across genres – from gun games like *Ghost Squad* to music games such as the *Beatmania IIDX* series, and even racing games like *Mario Kart Arcade GP*. However international arcade operators didn't adopt the cards in huge numbers, meaning that they're still primarily found in the Asian market. Another major development was the addition of online functionality

A LONG WAY FROM HOME

Where arcade conversions once sold home hardware, in recent years you're far more likely to see arcade games using licensed products to entice players. While film licences like *Terminator Salvation* and *Transformers* continue to do big business, you're now also likely to see familiar names from console and mobile gaming appearing in the arcade. The trend became noticeable around 2005 – while Global VR had been using EA licences such as *Need For Speed* for some time, they were joined by the likes of *F-Zero AX* and *Mario Kart Arcade GP* – takes on popular Nintendo series by Sega and Namco respectively. More recently, popular mobile games such

Lightgun games are now one of the few genres in the arcade

to arcade games. Western releases such as the *Big Buck* series of hunting games often feature national high score tables and tournament features, while online multiplayer is usually reserved for Japanese games. The poster child for this approach is Sega's *Border Break*, a mech combat game that has generated over £60 million in sales since its introduction in 2009.

But the majority of arcade manufacturers today aren't making games for the long-departed hardcore gamer – they're making them for the people visiting theme parks, seaside resorts and bowling alleys. Though there are still dedicated arcades which are running at a profit, the locations that have best weathered the storm are US chains like Dave & Busters and Chuck E Cheese's, where arcade games serve as a supplementary attraction rather than the main draw. It's a simple change but one that has required developers to adjust their development practices. "The arcade is a much more casual space," Eugene tells us. "so we have to make a game wider as opposed to deeper, and make sure every player has fun and a challenge. We have to go light on the punishment, even though it is always fun to see a player totally destroyed."

The other major adjustment, at least as far as the Western market is concerned, has been the marginalisation of genres. Music games have suffered heavily, thanks to a combination of recession-fuelled conservatism and the boom (and subsequent decline) of peripheral-based music games on home consoles. Five new music games were introduced to the UK market at 2009's Amusements Trade Exhibition International show, but by 2013's European Amusement and Gaming International show the genre was absent

Arcade memory cards can become collectibles in their own right, featuring a variety of attractive designs.

Lightgun games with big licences attached tend to perform well.

Manufacturers now regularly utilise popular home console games to provide new products.

"It is always fun to see a player totally destroyed"

Eugene Jarvis

KEY EVENTS

2001

- [illegible] arising the use of [illegible] slots in arcades

2004

- SNK [illegible] game for the Neo Geo board due to [illegible] launch

2005

- Sigma Dal[illegible] purchases Taito Corporation in September to [illegible] the arcade [illegible]

2006

- Online com[illegible] news site Arcade Heroes launches in December, [illegible] player perspective with [illegible] insight

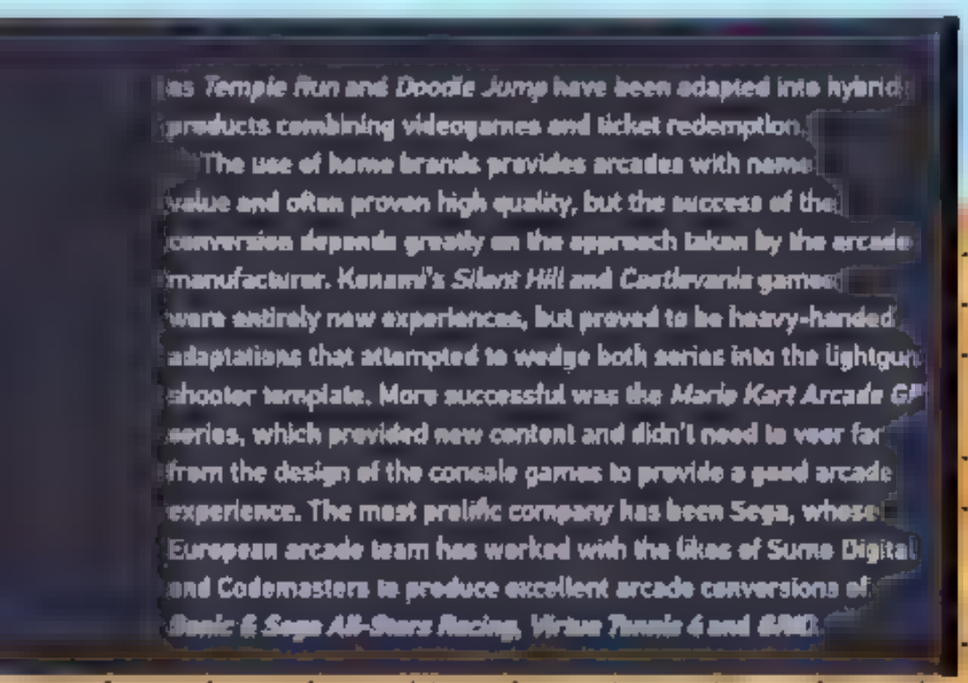
2011

- Re:Loaded

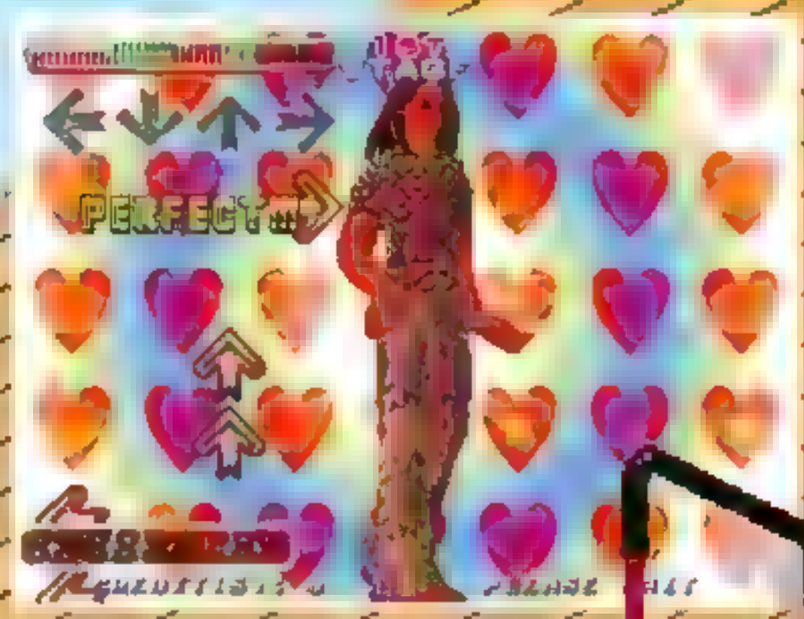
and Konami, the genre's major player, was no longer providing arcade videogames to the UK. Meanwhile traditional joystick-based games have almost disappeared. While some notable exceptions exist – *Super Street Fighter IV*, *Virtua Tennis 4* and *Pac-Man Battle Royale* have all arrived in the last few years – the market today is primarily composed of driving games and lightgun games. The result is that products are developed with those genres in mind. Where *Batman* was represented with scrolling fighters in the Nineties, in 2013 Raw Thrills adapted the licence with a driving game that harks back to the likes of *Chase HQ*.

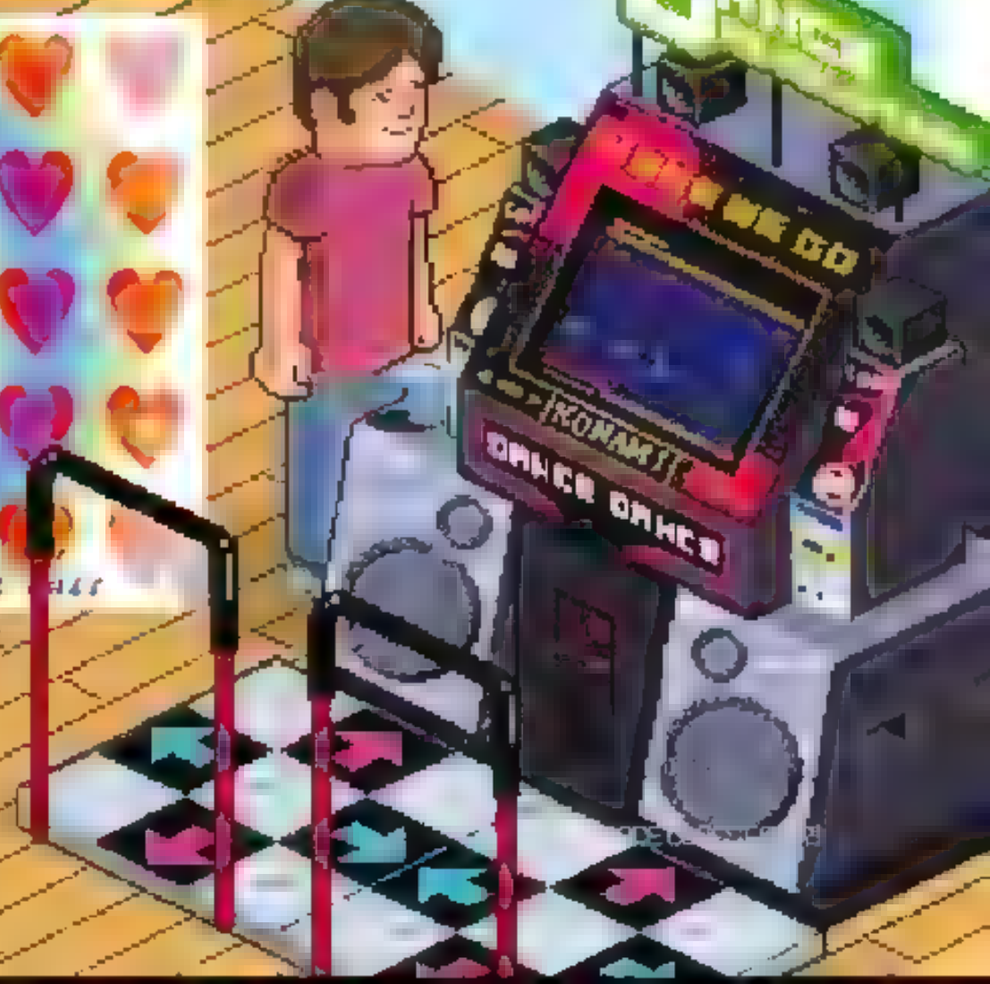
But ultimately, that situation makes sense. "The arcade is all about physicality and human interface," Eugene tells us, and when you look at the new products to hit the market, the most successful ones hit a number of his key features – "Huge monitors, immersive racing cockpits and physical I/O like lightguns, motion cabinets, leaning motorcycles." No matter how impressive your home entertainment system, it doesn't offer domed screens, moving seats or air jets – and it probably never will. The likes of *Mach Storm* would lose something in the home, and it's this fact that ensures that arcade games remain in demand.

Despite the diminished status of the arcade in the bigger picture of videogames, Eugene's ambitions remain sky high. "Like bank robbers living for that one last job, arcade developers dream of creating the next humongous hit – the new *Pac-Man*, *Tetris* or *Angry Birds* that will catch the world on fire." Perhaps in the future **Retro Gamer** will be telling the story of how Eugene created that new arcade sensation. We can only hope so.



...as *Temple Run* and *Doodle Jump* have been adapted into hybrid products combining videogames and ticket redemption. The use of home brands provides arcades with name value and often proven high quality, but the success of the conversion depends greatly on the approach taken by the arcade manufacturer. Konami's *Silent Hill* and *Castlevania* games were entirely new experiences, but proved to be heavy-handed adaptations that attempted to wedge both series into the lightgun shooter template. More successful was the *Mario Kart Arcade GP* series, which provided new content and didn't need to veer far from the design of the console games to provide a good arcade experience. The most prolific company has been Sega, whose European arcade team has worked with the likes of Sumo Digital and Codemasters to produce excellent arcade conversions of *Sonic & Sega All-Stars Racing*, *Virtua Tennis 4* and *F355*.





THE BEST ARCADE IN THE WORLD

Funspot arcade in New Hampshire, USA, is a glorious reminder of the days when arcades ruled the gaming world. Paul Drury reports from retro heaven

FUN THREE

BOB LAWTON

OWNER AND FOUNDER OF FUNSPOT

■ Bob opened up the first Funspot in 1952 with his brother John, who sadly passed away in 2003. During the boom years of the Eighties, they ran Funspot arcades across New Hampshire and even as far afield as Florida.

GARY VINCENT

FUNSPOT MANAGER AND ACAM PRESIDENT

■ Gary took a summer job at Funspot in 1981 and never left. He was instrumental in creating the museum and he still spends many hours restoring old cabinets, ready to bring them onto the arcade floor.

MIKE STULIR

ACAM BOARD MEMBER

■ Mike is one of the many volunteers who devote their time to making ACAM such an extraordinary place. "I want to make sure these pieces of Americana are here for future generations to see and enjoy," he says, proudly.

BOB LAWTON PATS THE HULKING *AFTER BURNER* COCKPIT CABINET AND SMILES. "WE PAID $11,000 FOR THIS IN APRIL 1987, WHICH WAS A HUGE AMOUNT OF MONEY BACK THEN. BY 1 JULY THAT YEAR, IT HAD PAID FOR ITSELF. PEOPLE WERE QUEUING UP TO PLAY IT!"

Bob, the founder and general manager of Funspot, can talk about any of the machines in his colossal arcade – officially named the biggest in the world by Guinness World Records in 2008 – as if it were an old friend. And Bob has a lot of friends. Over 600 machines are spread across three floors and walking through the building is like taking a tour through the history of arcades. You'll spot ancient baseball flicker games, electro-mechanical machines from the Sixties, scores of pinball tables and even one of those 'Love Tester' gadgets.

There's a whole mini-golf course, too; a sweet nod to the origins of Funspot. Back in 1962, Bob, fresh from graduating with a degree in chemistry, swapped test tubes for golf clubs and built a course on the second floor of the Tarlson building in Weirs Beach, New Hampshire, a short walk from Funspot's current home. In partnership with his brother John, the pair built up the business over the following two decades, adding rifle galleries, a skee-ball alley and numerous other arcade attractions. Then one day in the mid-Seventies, in walked an animated Italian, who began gesticulating wildly.

"He was waving his hands and saying, 'Let me get rid of all this junk and put in some good games'," laughs Bob. "He was an operator from over in Concord and the first game he brought us was *Tank*. That one machine took more than the whole room of nickel and dime games we had. It showed us what videogames were going to do. I loved that guy. We stayed with him for years!"

So Funspot rode the videogame wave from the pioneering Seventies through the Golden Age of the Eighties and into the last real hurrah of arcade cabinets in the Nineties. And they're all still here for gamers to enjoy. Classics like *Robotron* and *Asteroids*, obscurities such as *Space Fury* and *Quantum*, monsters like the *G-Loc* full-motion 360 cab and a row of linked-up *Daytona USA* machines.

Bob Lawton (far right) regales his nephew Steve (centre) and RG's Paul Drury with tales from the arcade business.

"They just don't make upright driving cabinets anymore."

Ancient head-to-head racing game *Indy 4*.

ACAM boasts over 300 cabinets, from old favourites to real rarities.

Controversial game *Death Race* coexists with the inoffensive *Pong*.

We may be spoilt these days by having access to all these titles via downloads and emulation, but nothing beats the thrill of playing your favourites on an original cabinet in their natural arcade habitat – a habitat that has sadly almost vanished.

"I was noticing classic games were disappearing and arcades were disappearing," explains Gary Vincent, general manager and part of the Funspot family for over 30 years. "So at a staff meeting in September 1998, I asked if I could gather all the older games together, like a museum to celebrate the history of gaming."

Gary's idea slowly evolved into the American Classic Arcade Museum, or ACAM for short, a superlative collection of over 300 classic arcade games housed on the top floor of Funspot. Walking along the aisles of cabinets, admiring a pristine *Death Race*, smiling at the *Pac-Man* machine on which Billy Mitchell famously (or infamously, if you know the back-story) achieved his 'perfect game' and stopping for a sit-down on *Buck Rogers* is a magical experience.

Even the lighting, décor and background music has been lovingly chosen to recreate the arcade as it was in its Eighties heyday. "It brings back memories of when I first started here," says Gary, wistfully. "All the sights and sounds I remember from my first summer working here in 1981. It's kinda cool."

"Gary's a visionary," enthuses Mike Stulir, who sits on the board of directors of the museum. "He can recognise good ways to entertain and inform the public. We have students from computer development programmes use us as a resource. One college eliminated one of their course textbooks on the basis of what they could learn from us. Last time they visited, they brought three busloads of students to come and find out about gaming in the old days!"

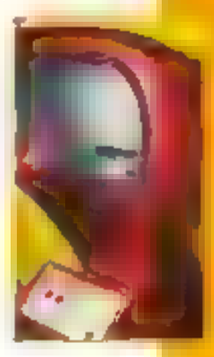
Who said learning can't be fun? Whether you want to explore the history of videogaming or simply enjoy playing all the machines that consumed your pocket money as a child, ACAM is an essential visit for retro gamers. It's open all year round, though you may want to consider visiting during its annual International Classic Videogame Tournament in late May. Now in its 16th year, the event attracts the cream of arcade gamers from around the globe, meaning you can test your high scoring skills against numerous world record holders or at least grin as you spot famous faces from such films as *King Of Kong* and *Chasing Ghosts*.

When you do get to finally walk through the hallowed doors of this gaming mecca, make sure you check out the 'Retro Gamer Wall', where you'll find past articles on Funspot taken from our pages, and then seek out Bob Lawton himself and say we sent you. Despite being in his 80s, Bob still opens up the arcade every day and always provides a warm welcome. "I just love working," he laughs over a beer in the arcade's DA Long tavern, named after his grandfather. "My family all work here, too. It's my life!"

For more on this marvellous place, see www.funspotnh.com.

MUST PLAYS

COMPUTER SPACE 1971



■ This is where it all started. Inspired by the mainframe game *Spacewar* Nolan Bushnell and Ted Dabney created their own simplified version, which became the first commercially produced cabinet. This sleek cabinet looks impressive, especially sat opposite Atari's *Pong*.

INDY 4 1976

■ This imposing four-player racing game greets you at the top of stairs as you enter ACAM and is a poignant reminder of the arcade's long history. "It was the third videogame we got after *Tank* and *Seawolf* and during the summer of 1976, it was taking $140 a day," smiles Bob.

DOMINO MAN 1983

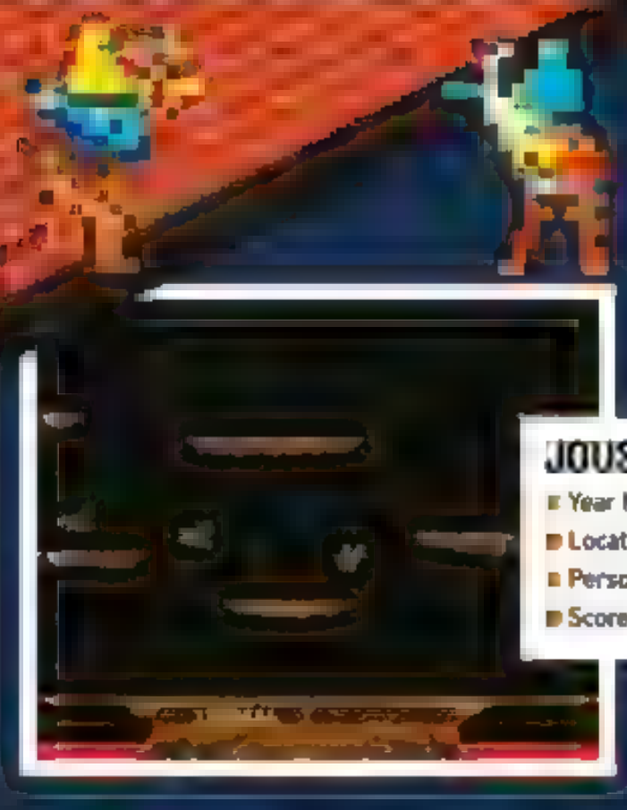
■ An excellent example of creative cabinet design, this game features a moustached, balding artist, who would soon swap his dominoes for beer mugs in *Tapper*. One of the many donations to the Museum since its official launch in January 2000, this one came from Randy Lawton, Bob's nephew.

WACKO 1983

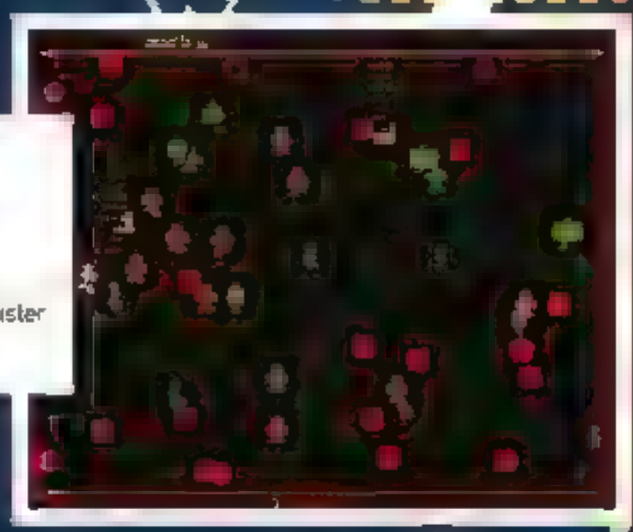
■ No, you are holding the magazine correctly. "This is from that era when manufacturers would do anything to make their game stand out," remembers Gary. "It must have cost lots more to make it crooked like that. I love that people went the extra mile with a bizarre cabinet like this."

SPACE HARRIER 1985

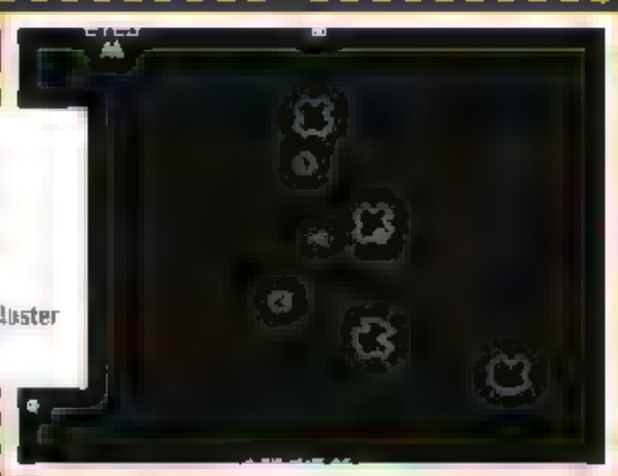
■ A compelling reason for why nothing beats playing a game on the original hardware, this full-motion cockpit cabinet tosses you through the Fantasy Zone with gay abandon. Modelled here by *Missile Command* champ Tony Temple, who put his back out shortly afterwards. Is the game worth the injury? Yes.



JOUST
- Year Made: 2012
- Location: Seattle, WA, USA
- Person: John McAllister
- Score: 107,301,150



ROBOTRON
- Year Made: 2009
- Location: Renton, Washington USA
- Person: John McAllister
- Score: 1,236,950



ASTEROIDS
- Year Made: 2010
- Location: Renton, Washington USA
- Person: John McAllister
- Score: 41,338,740

GARY BRACEY

"It was always Donkey Kong for me. The first game that really got me hooked into videogames... and one which I spent a fortune (and many hours) on!"

SCORE KILLERS

Walter Day tells Retro Gamer about Twin Galaxies and the birth of score attacking

Why did you decide to travel America collecting high scores?

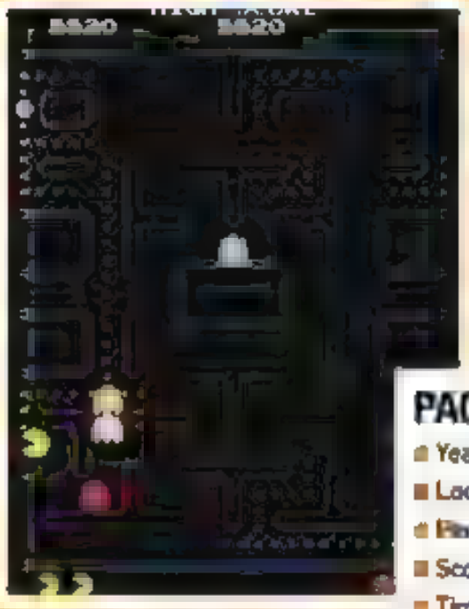
I loved playing videogames so much that I opened an arcade as an excuse to be able to play more and more videogames. It was called Twin Galaxies and it opened on 10 November 1981 in Ottumwa, Iowa. I practice Transcendental Meditation every day and, like many people who practice TM, I noticed increases in my mental clarity and eye-hand coordination. So, I was already very open to the idea that the best gamers would be people who were using more of their latent mental capacity and it would express itself in terms of higher and higher scores achieved in competitive gaming. So, I went on a personal quest to find the greatest gamers, the ones who could merge into a sort of higher-state of consciousness and out-think the program. And, such people would be recognisable by their unprecedented scores and unmatchable skill set.

When did you realise that the general public was interested in high scores?

In 1982 a local gamer named Tony Mattan showed me a copy of the January edition of *Time* magazine. It had a cover story on videogames sweeping the world, and in the story was mention of one Steve Juraszek of Illinois who had scored 15 million points on *Defender*. Not surprisingly, the public was viewing this as the world record and people all over America were bent on breaking Juraszek's score. I allowed Tony Mattan to make a world record attempt and he did last for 24 hours, scoring about 24 million points. But to my surprise, during his marathon the media began to call from far away cities like Kansas City, St Louis, Des Moines, Atlanta and Chicago, wanting updates on Tony's progress. This was only the beginning. Interestingly, as more and more high-score attempts began to manifest, Twin Galaxies would invariably be a part of each story in the media as we would be the adjudicators of the event. A media expert once estimated that Twin Galaxies was in the news more than 10,000 times during the 1982-1986 era, concluding that on any given day during that time there was someone going for a world record on a video game and the media was covering it.

How did you go from an oil broker to a comedian and then owner of the Twin Galaxies arcade? That's quite a trajectory.

Jon Bloch and I used to do Vaudeville-like skits, performing sporadically in the Catskills (Upper State New York) and in Iowa. And also, I was an accomplished Ragtime Piano player, appearing on posters in the Eighties. Then, during the Spring and Summer of 1980, I was working in downtown Houston as an oil broker, creating deals between the majors (Conoco, Exxon, Tenneco) and the traders (Tesoro, Tosco and Apex). It was here in Houston that I found videogames as my true love and the first seed of desire was planted to someday own my own arcade.

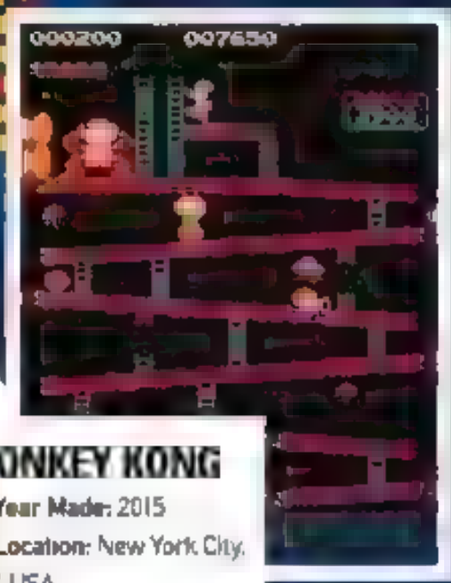


PAC-MAN

- Year Made: 2012
- Location: Beavercreek, OH, USA
- Person: David Race
- Score: 3,333,360
- Time: 3:33:12.69 seconds

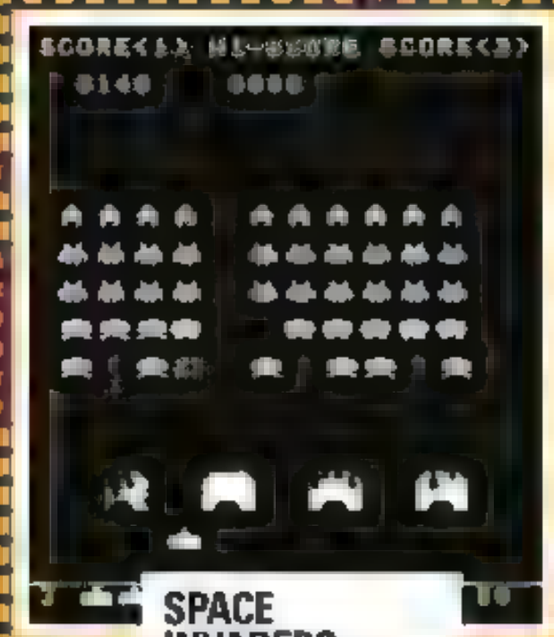
TEMPEST

- Year Made: 2002
- Location: New Hampshire, USA
- Person: Laszlo Takac
- Score: 782,217



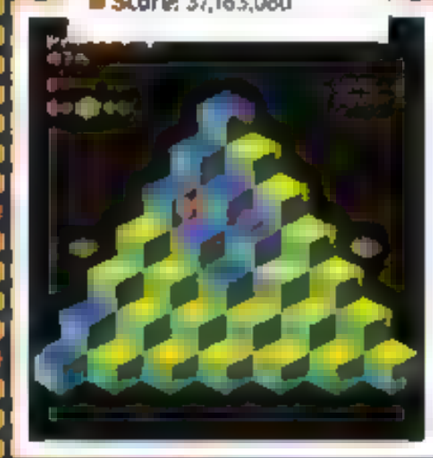
DONKEY KONG

- Year Made: 2015
- Location: New York City, NY, USA
- Person: Wes Copeland
- Score: 1,218,000



SPACE INVADERS

- Year Made: 2013
- Location: Flemington, N.J. USA
- Person: Richie Knucklez
- Score: 184,870

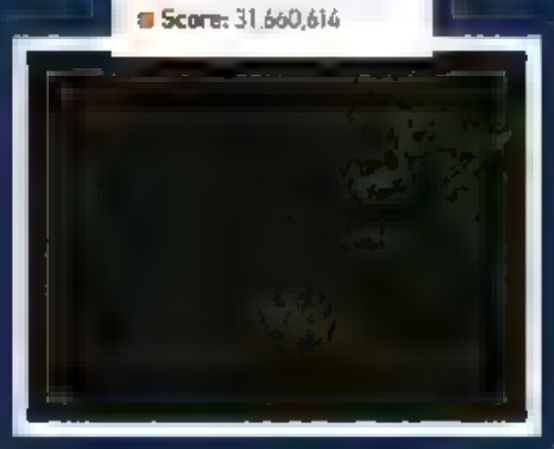


Q*BERT

- Year Made: 2013
- Location: Flemington, New Jersey USA
- Person: George Leutz
- Score: 37,163,080

FROGGER

- Year Made: 2012
- Location: Virginia, USA
- Person: Michael Smith
- Score: 970,440



STAR WARS

- Year Made: 2008
- Location: Unknown
- Person: David Palmer
- Score: 31,660,614

How did it feel when Twin Galaxies was recognised by *The Guinness Book Of World Records*?

t happened in the summer of 1983. They had never recognised games because they were intimidated by the mass of details and variations in games and gameplay, acknowledging that it was a field that they were reluctant to try and master. So, they relied on our expertise. Our contests and adjudication supplied them with all their scores for the 1984, 1985 and 1986 books. And, then later, the 2008, 2009 and then much of the first four or five Gamer's Editions.

What's the ultimate arcade game for score chasing and why?

here are numerous games that test a man's soul. And, they are so difficult that it takes a major amount of practice and luck to raise your high score even 1,000 more points. They are all played on Twin Galaxies Tournament Settings (which means you get only a total of five men). They are *Robotron*, *Defender*, *Stargate*, *Q*bert* and *Missile Command*. And, of course, there is *Donkey Kong*, the most legendary contest game of them all.

When do you feel the golden period for scores was and why?

The Golden Age of High Score Competition lasted from 1980-1985. After that time, there were fewer arcades available and very few promotions or contests. By then, little

inspiration remained to be a high-score champ

What's the most impressive high score endurance test you've witnessed?

Recently, George Leutz, of New York City, lasted about 85 hours on one quarter, playing *Q*bert* to a new world record, eclipsing a record that had stood for more than 30 years!

Why did you leave TG and do you regret it?

I want to focus on the educational and historical aspects of our gaming legacy by creating a set of videogame trading cards that commemorate the history of the global videogame

culture, honoring the iconic industry pioneers, the legendary game designers, the celebrated world champions and the historic milestones and landmark events. Plus, I am writing a musical based on my experiences running Twin Galaxies back when the City of Ottumwa became the "Video Game Capital of the World (1981-1984)." These new projects have me excited so I don't miss running TG

Is it disappointing to see all your hard work currently undone?

TG is about to start up again under new leadership. So, all is well in the Video Game Capital of the World!

Pong

THE TENNIS GAME THAT HELPED REVIVE THE ARCADE SCENE

- ATARI INC
- ARCADE
- 1972

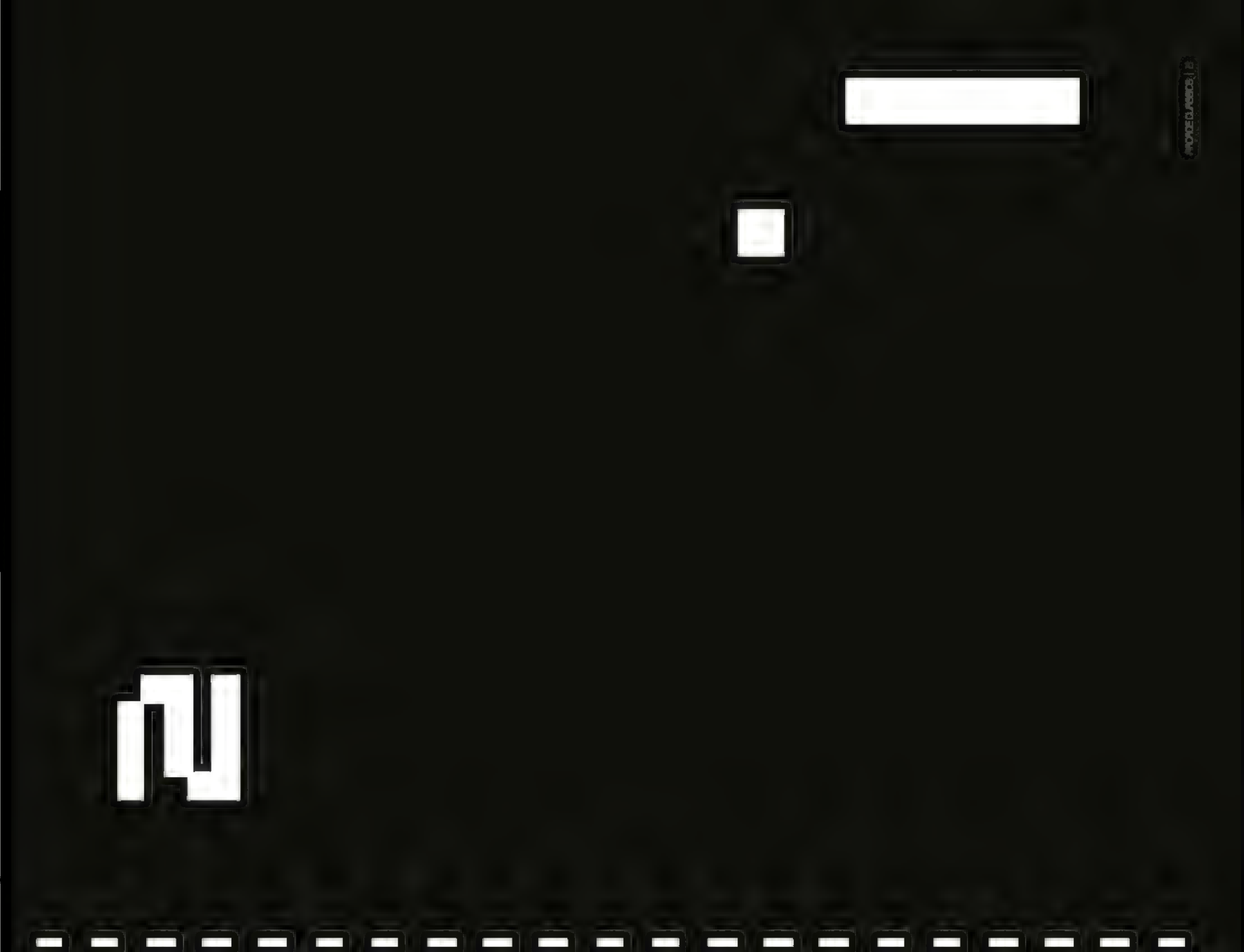
It's easy to take for granted today, but *Pong* was a huge deal when it appeared in 1972. It was one of the first commercially successful arcade games, [illegible] the way in the likes of Space Invaders, Pac-Man and countless other classics. It was enduring, too, and I can still remember some arcades having old machines when I was a young nipper in the late Seventies/early Eighties.

Pong really came into its own with a second player, as it made the game amazingly competitive. Although you can only move your bat up and down, it's actually possible to pull off some sweet moves with deft touches of the control pad. There's nothing more satisfying than having a long, drawn-out rally before slamming past your opponent's defences with a cleverly angled ball.

It may have had only six years and extremely simple sound, but it really didn't matter. *Pong* was a gateway into another world, a gateway that proved that monitor screens could create more than just passive entertainment, no matter how enjoyable it may have been.

While *Pong* enjoyed great success in arcades, it also dominated homes thanks to an [illegible] number of official and unofficial clones that ported the game at every opportunity. My fondest memories are playing a version of *Pong* that came with numerous other games on my aunty's Binatone system, but there were lots of other [illegible] and your own memories may be [illegible].

Pong may seem old hat, but if you do manage to find a version to play, you'll discover that it's still ridiculously addictive. ★



Computer Space

If you spent your youth hunched over an arcade cabinet blasting aliens, Computer Space is where it all began. Paul Drury talks to Nolan Bushnell and Ted Dabney about the granddaddy of videogames

IN THE KNOW

- PUBLISHER: NUTTING
- DEVELOPER: SYZYGY
- RELEASED: 1971
- PLATFORMS: ARCADE
- GENRE: SHOOT-'EM-UP

It's summer 1966 and a young Nolan Bushnell, sporting sideburns but no bushy beard yet, is strolling through the Lagoon Amusement Park in Farmington, Utah. He's manager of the games department, working there to help pay his way through university. He smiles at the rows of pinball tables and electro-mechanical machines, guzzling coins from eager players.

Back at the University of Utah, Nolan is up late, playing *Spacewar!* in the computer lab into the early hours. The game, created by Steve Russell and friends at MIT in 1962, has two starship commanders locked in a deep space dogfight. It's a big hit on campus. And suddenly, a connection is made.

"I turned to the fraternity brother I was playing against and said: 'This is a great game! We could get people to put a quarter in to play this at Lagoon!'" exclaims Nolan. "I envisioned a row of screens coming from a central computer, each with a coin slot. Then we looked around us at this million dollar computer and thought, 'Mmm, we've got a long way to go...'"

It wouldn't be until the next decade that, as co-founder of Atari, Nolan would see his vision of aisles of arcade machines realised. For now, the prohibitive hardware costs – Nolan estimates even the

display screens cost $20,000 – meant his videogame dream would have to wait. He graduated in 1968 and joined Ampex, a prominent American electronics company and pioneer in audio and video technology.

"I'd worked at Ampex for about a year, and as an engineer you get all these trade magazines," explains Nolan. "There was an ad in there that alerted me to the Data General Nova computer. Up to then, minicomputers were like $40,000, and then this comes along for $4,000 and I'm like, 'Woah, this might be good enough!'"

Nolan eagerly sent away for the manuals to this breakthrough machine and began making paper designs for a *Spacewar!* setup with four screens running from a single computer. With four coin slots collecting quarters, he hoped it could earn enough to pay for the high initial hardware costs and become a viable proposition to sell, not to bars, but amusement parks. "I told everyone at Ampex I was working on a videogame," smiles Nolan, "and they all thought I was loony."

Well, not quite everyone. Ted Dabney had joined Ampex in 1961, working in the military products unit for six years before transferring to the Videofile division in Sunnyvale, California. "I shared an office with Nolan and he took me over to Stanford to look at *Spacewar!*," recalls Ted. "I thought it was great... if you had a big enough computer! I didn't know if he was mad or not but I thought it was something worth trying."

Ted and Nolan teamed up with programmer Larry Bryan, who had access to a PDP computer and was to be responsible for the coding, and they began calculating how many games they could run from one computer. "We concluded there was no way it was going to work. It just wasn't fast enough," notes Ted.

"Plus Larry never got anywhere with the programming."

"The cycle time of the machines was simply too slow to support multiple screens," agrees Nolan. "Things like drawing the rocket ship still took a lot of computer time. We'd gone down from four, to three, to two screens. An electro-mechanical game cost around $900 and I thought we could charge a little more than that, but not $3,000 a screen! The economic proposition was gone..."

> "I told everyone I was working on a videogame and they all thought I was loony"
>
> NOLAN HAD THE LAST LAUGH, THOUGH...

And so the quest to bring videogames into the arcades almost died with the Sixties. Then, at the start of the new decade, there came

> The iconic *Computer Space* flyer. Nolan: "The girl was a topless dancer at a bar called The Brass Rail. It was done by Steve Rebeson. We always thought he had a little thing with her but was never brave for sure."

screen, the project was suddenly back in business. There was just one problem: the circuitry didn't exist. So, in 1970, Ted moved his daughter out of her bedroom and converted it into a workshop, where he began tinkering with an old telly and off-the-shelf components bought from electronics stores.

"I started by figuring out how to move something on the screen. It took me quite a while but finally I got these counters to do what I wanted them to, so you could change them by one bit and get very slow

outline of your craft. Each dot you saw on screen corresponded to a discrete diode on a circuit board inside the machine. These were arranged in a matrix, one for each direction the rocket ship could face. "What Nolan did was pretty smart," chuckles Ted. "He created the diode matrix and just before it went into

"I got a little square moving on the screen. Nolan said: 'Now we need a rocket ship!'"

TED JOINS THE DOTS...

movement of a little square on the screen or by two bits and get faster movement. The next thing was, well, what are you gonna move? Nolan said: 'We need a rocket ship!'"

The ship you command in your quest to outgun flying saucers intent on your destruction was fashioned from a series of dots, forming the

production, he laid it out on the board, in the shape of the actual rocket ship, so if you had a problem, you could easily figure out what part wasn't working properly."

"Rotating the rocket was tricky," adds Nolan, "but the eyeball is quite forgiving. The dots are changing position on a 16x16 matrix and the places you put the dots aren't quite right, but by having the separation of the dots, your eye kind of fudges it and says, 'Yeah, this is the same rocket ship...'"

Now, we all know that in space no one can hear you scream, but blasting alien scum wouldn't be half

an epiphany. Ironically, a game called *Computer Space* only became a reality when one key component was removed – the computer.

"Nolan's a smart guy and he was dicking around with a TV set, adjusting the vertical and horizontal hold and seeing the picture move," says Ted. "He asked me why that happens. I explained it to him and he said: 'Could we use this?' I said: 'Well, we'd have to do it digitally because with analogue we wouldn't have any control.' I explained we'd need a counter for the sync and one for the video and let the video counter change in respect to the sync counter. He said: 'Could we do that?' I didn't know yet..."

By replacing the expensive computer with circuitry built from cheap electronic components that could display and manipulate images on a standard television

DEVELOPER HIGHLIGHTS

PONG
SYSTEM: ARCADE
YEAR: 1972

SPACE RACE
SYSTEM: ARCADE
YEAR: 1973

ISAAC ASIMOV PRESENTS SUPER QUIZ
SYSTEM: ARCADE
(CHUCK E CHEESE EXCLUSIVE)
YEAR: 1979

BEND IT LIKE BUSHNELL

IF YOU'VE SEEN *Computer Space* in action, you'll notice that after launching a shot at those vic ous saucers, you can 'bend' your bullet towards your intended target by rotating your ship. It s an ingenious feature, which later appeared on *Combat* for the VCS, though it emerges it was more a case of necessity. "The missile starts out from the front of the rocket ship, but when the ship moves, the front of the ship is in a different place on screen," explains Ted. "There was no way we could remember a point on screen, so it had to move in relation to the front of the ship. Let's call it a gu ded missile!" Ted added in a clever feature to signify a successful hit, too. "I just nverted the video so the screen flashed white. It was a cheap, easy way to create the sense of an explosion." Ted also used this inversion technique to signal extended play and called it 'hyperspace', yet another debt that Atari's biggest hit, *Asteroids*, owes to its granddad.

Once you've spent some time trying to blast those pesky saucers while dodging their bullets within a strict time limit, we think you'll notice several things. Although *Computer Space* is clearly inspired by *Spacewar!*, it is certainly no clone. It's a single-player game, for a start, and there's no central star exerting a gravitational pull either. We also think you'll be struck by the difficulty. Your ship is in perpetual motion, which may adhere to the laws of physics in outer space but proves rather inconvenient to *Asteroids* players, used to their ship slowing down and stopping if you leave off the thrust. This is further compounded by the deadly accuracy of your flying saucer foes. Why did Nolan seem intent on killing the first generation of videogame players with such regularity?

"The idea it was too hard never crossed my mind," he laughs. "All my friends loved it, but then all my friends were engineers. It wasn't until we put it into a beer bar and people were totally baffled that we thought maybe we've overshot our mark! As for making *Computer Space* a one-player game, the coin-op industry was based around solitary game players. I mean, Bally turned *Pong* down because it was two-player!"

With the game elements starting to come together, Nolan decided to present his idea to Nutting Associates. The California-based

as much fun if performed in silence. Cleverly using a 6V Zener diode, a voltage regulating device that just happened to give off pink noise as it did its job, Ted added a little amplifier and an integrator that charged up and decayed to fade the volume out. "I built the sound circuits and motion circuitry," he says, proudly. "Then Nolan made them into a game."

At this point, RG is profoundly aware that we are talking about a game that, despite its huge historical importance, most of you have probably never played. Coming from a time before arcade machines used microprocessors, there is no 'code' for the usually helpful MAME to emulate, so unless you live near the Funspot arcade in New Hampshire, which has an actual machine in its classic games room, may we recommend the convenient 'simulator' found at **www.computerspacefan.com**, an excellent site that also catalogues the location of all surviving cabinets.

IN THE BEDROOM

SOME READERS MAY be aware of the ongoing dispute as to where the pioneering work on the *Computer Space* circuitry actually took place. For decades, it was thought that Nolan busted his daughter from her bedroom to set up shop there but, more recently, Ted has gone on record as saying it all happened at his house. We asked Nolan to clear up the controversy. "The real answer is that it was in both," he explains. "Ted was doing his work and I was doing mine. Quite frankly, I had forgotten he was working in his daughter's bedroom as well. The blogs can get carried away. I fuelled it by saying once that I didn't think he even had a daughter. That was grist for the mill."

Ted has a slightly different take on things. "My daughter Terri used to babysit for Nolan, so he knew I had a daughter, and his wife back then, Paula, would not let him do anything in that house. He didn't even own a soldering iron."

company had had considerable success in the coin-op industry with *Computer Quiz*, but with that product reaching the end of its commercial life, it was eager for new machines to manufacture. "I don't think they really understood what a videogame was, but they thought it sounded like a capital good idea," Nolan winks. "I'd only really got dots on the screen but I presented myself pretty well as an up-and-coming smart boffin – I was speaking British for you there – so they hired me as chief engineer. I left Ampex and was working for Nutting in the day, helping them finish up some projects, and at nights I was working with Ted on *Computer Space*. I specified in my contract I would retain rights to all the videogame technology, though."

The *Computer Space* circuitry had been coming together nicely, thanks to some assistance from an undergraduate on placement at Ampex by the name of Steve Bristow, and now that he had a position at a major player in the coin-op business, Nolan was

understandably enthusiastic about his groundbreaking project to bring *Spacewar!* out of the computer lab and into the arcades. Then he received some startling news. Someone else had had just the same idea.

As a student at Stanford in the mid-Sixties, Bill Pitts had been similarly entranced by *Spacewar!*. After graduating, he teamed up with school friend Hugh Tuck, whose hardware know-how and family money nicely complemented Bill's software skills. By the summer of 1971, their version of *Spacewar!*, entitled *Galaxy Game*, was almost ready to meet the public, when Nolan heard news of the project.

"I had some trepidation when I went over to see what they were doing," acknowledges Nolan, "but I had this suspicion that no one would have worked out how to do it as cheaply as I had. They had one in the coffee shop at Stanford, using a PDP-10, I think. I thought they'd done a great rendition of *Spacewar!*, but I did a quick costing and thought, 'This is no competition.'"

Nolan was right on both counts. *Galaxy Game* was far more faithful to the source material, but due to basing their machine around an actual computer rather than custom circuitry, it was hugely more expensive at around $20,000 in total and considerably more unreliable. Though it could never hope to recoup its cost in quarters,

> "When we put it in a bar, people were totally baffled"
>
> NOLAN UNDERSTANDS THAT COMPUTER SPACE IS HARD ENOUGH WHEN YOU'RE SOBER

Galaxy Game beat *Computer Space* to market by two months, debuting in September 1971, and thus has the honour of being the first arcade videogame. That original machine was replaced by a superior version the following year, utilising a PDP-11 that supported two play screens simultaneously, which remained in situ at Stanford's Treeidder Memorial Union throughout the Seventies. For more on this innovative oddity, see chapter two of *Replay*. Tristan Donovan's wonderfully readable history of videogames, or visit the machine itself in its new home at the Computer History Museum in Mountain View, California.

Undeterred, even encouraged by the appearance of this unexpected rival, Nolan pressed on, with Ted joining him at Nutting and proceeding to build a prototype cabinet ready for field-testing. The game debuted at the Dutch Goose bar in Menlo Park, California, in November 1971, with both proud parents accompanying their baby.

"Ted and I took it over in the back of my station wagon, and as soon as we plugged it in, there was an immediate cluster around the machine and play after play," enthuses Nolan. "We were convinced we had a major hit on our hands. But you see, the bar was a hangout for Stanford students, all smart as hell. Lots of engineers and maths and physics majors. Newton's second law wasn't a big problem for them! We put it in another few places and you could best describe the clientele as bimodal. They had no clue about what was going on. They'd say: 'I can't control this thing. How do you make it go right and left?' I remember trying to teach people about the thrust control and it just wasn't part of their DNA."

Worse still, the less cerebral crowd seemed to have taken their frustration out on the machine.

The prototype cabinet featured a joystick-cum-trigger controller, which snapped after a single day out in the field. For the version put into production, four buttons were used instead – rotate left, rotate right, thrust and fire – which may have bemused tipsy punters but was at least able to physically withstand their drunken advances.

More pleasing to players was the stylish cabinet the game sat within. "Form follows function," states Nolan. "This was a space game and so should have a space age cabinet. I made a model from Plasticine. I had a little bit of plastic for the screen and a piece of wood for the back, and moulded it to that shape. Ted found a fibreglass guy who figured out how to make it into the cabinet. I sent my model to the manufacturer and they scaled it up."

Fortunately, this didn't result in a Spinal Tap Stonehenge-style fiasco, and around 1,500 – although Nolan

Nolan poses with a rare(ish) *Computer Space* cabinet, of which less than 1000 are estimated to

thinks the figure may have been as high as 2,200 – of the futuristic-looking *Computer Space* machines were manufactured.

And the game flopped. Well, that's what the received wisdom seems to conclude. We wish to challenge this notion. The sales figures may have been dwarfed by future hits like *Pong* and *Asteroids* – which, you could

Andy Capp's Tavern, it sat next to a *Computer Space* cabinet, convincing Nolan that, in gameplay terms,

"I'm treated like a rock star. It's been 40 years coming and I love it!"

TED DABNEY IS LIVING PROOF THAT GOOD THINGS COME TO THOSE WHO WAIT IN THE GAMES INDUSTRY

argus, was a spiritual successor – but at the start of the Seventies, a successful pinball table would only sell around 2,000 units. It provided an income stream for Nolan and Ted, which helped to fund the *Pong* project. Indeed, when the very first *Pong* prototype was placed in

simplicity was the key to success. It was a philosophy that he and Ted would adhere to when they left Nutting and formed Atari the following year, thus kick-starting the whole videogames industry.

"I felt this was a medium, not just a product," says Nolan. "Remember, there were more games on the computers at university than *Spacewar!*. I'd done a game called *Fox And Geese*, there was a baseball game... people were programming! I was very happy with *Computer Space*. When you create something with your hands as well as your mind, it has a special place in your heart."

While Nolan went on to gain fame and fortune with Atari, Ted left the company in 1973, after an acrimonious falling out with his former friend. His crucial role in those early days of the games industry went unacknowledged for years, but recently, due to the efforts of games historian and author Leonard Herman, among others, the situation is changing.

"I don't give a diddly-squat about games," laughs Ted, "but getting this recognition is fantastic. I'm treated like a rock star. It's been 40 years coming and I love it!"

Thanks to Marty Goldberg and Jerry Jessop for their help with this article.

Space Men

We talk to three industry legends about their connection to Computer Space

STEVE BRISTOW had several placements at Ampex while studying at the University of California at Berkley – in the late Sixties and early Seventies. He later followed Nolan to Nutting Associates and worked on the two-player version of *Computer Space*, before moving to Atari, where he stayed until 1984.

"Nolan was my supervisor at Ampex and he had me working on some prototype circuits, which turned out to be portions of the memory and motion controller boards for *Computer Space*. I saw the schematics for the game in the office he shared with Ted and I saw pieces of the prototype in a more assembled form when I visited them at Nutting. I first saw the production version when I started working at Nutting in March of '72. Production was just starting in earnest and I was the only person who troubleshot and fixed the boards. Of course I told people what I was doing and how cool it was! I was responsible for assembling and maintaining the two-player version at the AMOA show in Chicago in November '72. After that, I returned to school and took over the 40 or so coin-operated games that Syzygy/Atari had placed all over Berkeley and Oakland. I had two *Computer Space* machines and one was in Larry Blake's, a bar at UC Berkeley, near a *Galaxy Game*, and I'm sure we out-earned it. The coin box was never overflowing, but, in fairness, it was a one-gallon paint can, which could hold a lot more than the *Pong* prototype!"

AL ALCORN was a colleague of Nolan and Ted's at Ampex and was one of Atari's first employees. He created *Pong*, which became the first major hit for coin-op videogames. He stayed with Atari into the Eighties, working on such successes as the home *Pong* and the VCS.

"I first saw *Computer Space* when Nolan and Ted invited some of their Ampex friends over to Nutting. I thought it was an interesting machine but didn't expect it to be a great success. When I came to work on *Pong*, Nolan gave me a set of schematics for *Computer Space*, but I really didn't use them, as they were drawn in a style that made it difficult to understand. We discussed the fundamentals of his patented motion circuit and I went from there. Remember, Nolan told me *Pong* was going to be a home game, so it had to use far fewer chips than *Computer Space*! I remember Nolan and Ted talking about one of the first locations for a *Computer Space* machine at a mall. The machine had a prototype joystick and it was destroyed in a day. They gave up and went with buttons. I never actually serviced a *Computer Space* – Steve Bristow has more experience with that – but I do recall servicing a *Pong* cabinet at the Stanford student union and competing with a *Galaxy Game* by Bill Pitts. I would be scooping quarters out of our game while Bill was struggling with his."

ARCHER MACLEAN has been in the games industry for over 30 years, creating such home computer hits as *Dropzone*, *IK+* and *Jimmy White's Whirlwind Snooker*. He also restores arcade cabinets and, among his large collection of pristine machines, is a beautiful blue *Computer Space*.

"I was hunting for a *Computer Space* for ages, and eventually one came up on eBay about 12 years ago. It was a bit dead and had a large foot sized 'kick' hole on the lower front. This didn't put me off as I believed I had the electronics skills to sort the PCB out and my mate John is an expert at candy-apple sparkly paint sprays on Sixties-style fibreglass beach buggies! When it arrived, it had an aged-looking two-page typed note lying in the bottom, which basically said, 'Any problems, call Nolan direct on (415) 961-9373'. I think he's gone a few places since then! Amazingly, it's been 100 per cent reliable since getting it working in 2001. The screen is an ancient valve-based TV, which takes a minute to 'glow' into life, and the chips used on the PCBs are Jurassic-era ECLs and TTLs. Most of them have had their ID chemically removed to prevent cloning back in the day. Once it was restored, it has been in great demand from museums and television companies. The best was when it was used for the actual film presentation at the 2009 BAFTA Fellowship award given to Mr Bushnell himself, nearly 40 years after he designed it."

INSTRUCTION MANUAL
FOR
NUTTING INDUSTRIES

NUTTING INDUSTRIES

When you think of the pioneers of the modern coin-op industry or the game console business, names like Bushnell and Baer come to mind along with companies like Atari or Magnavox. As Marty Goldberg shows, the last name Nutting deserves a similar level of reverence

While most talk of the early video arcade industry usually centres around Nolan Bushnell and Atari, there's another individual whose firms and their contributions to both video arcade games and the coin-operated amusements industry overall are arguably equally as important. Nutting Industries (NI), Milwaukee Coin Industries (MCI) and Dave Nutting Associates (DNA) were a succession of companies spanning a 17-year period of innovation, resulting in products that either redefined the way things were or led the way in showing how things were moving to become. All three were also created by the venerable David Nutting.

The story begins in 1966 when David was working at Brooks Stevens Design Associates, a product design firm with experience in every industry. Seriously, every industry. By this time Brooks Stevens had designed everything from the original Oscar Mayer Wienermobile to logos and packaging for Miller Brewing to the very first SUV, the Jeep Wagoneer which David had assisted on as well. It was around this time in 1966 that David got a call from his brother, Bill Nutting. "Bill gave me a call and told me about his idea and asked me if I would be interested in repackaging his teaching machine into a coin-operated game," says David. That idea was a plan to get both brothers into the coin-op industry, an industry they knew nothing about, with a new 'game' based on a product Bill had been an investor in. That product, a teaching machine for the U.S. Navy, was designed to test students by using a filmstrip projected onto a screen to ask multiple-choice questions. Students would then answer by pushing A, B, C, D or E buttons. During one of their meetings, one of the other investors jokingly suggested, "Why not put a coin slot on the quiz machine and make it an entertainment device?" So now here was Bill asking if he could leverage David's design and engineering background to do that very thing. "I want you to help repackage my group's multiple-choice teaching machine into a coin-operated quiz game," came the call to his brother David in Milwaukee, Wisconsin, setting up the same successful start-up formula mirrored later by Bushnell/Dabney and Jobs/Wozniak, the visionary and the doer.

As David recalls, "Bill was learning that coin-operated equipment was sold through distributors located in the major cities. Bill flew out to Milwaukee where we spent several days putting together a plan. At the same time, Bill visited distributors in Chicago, Detroit and New York, learning more about the

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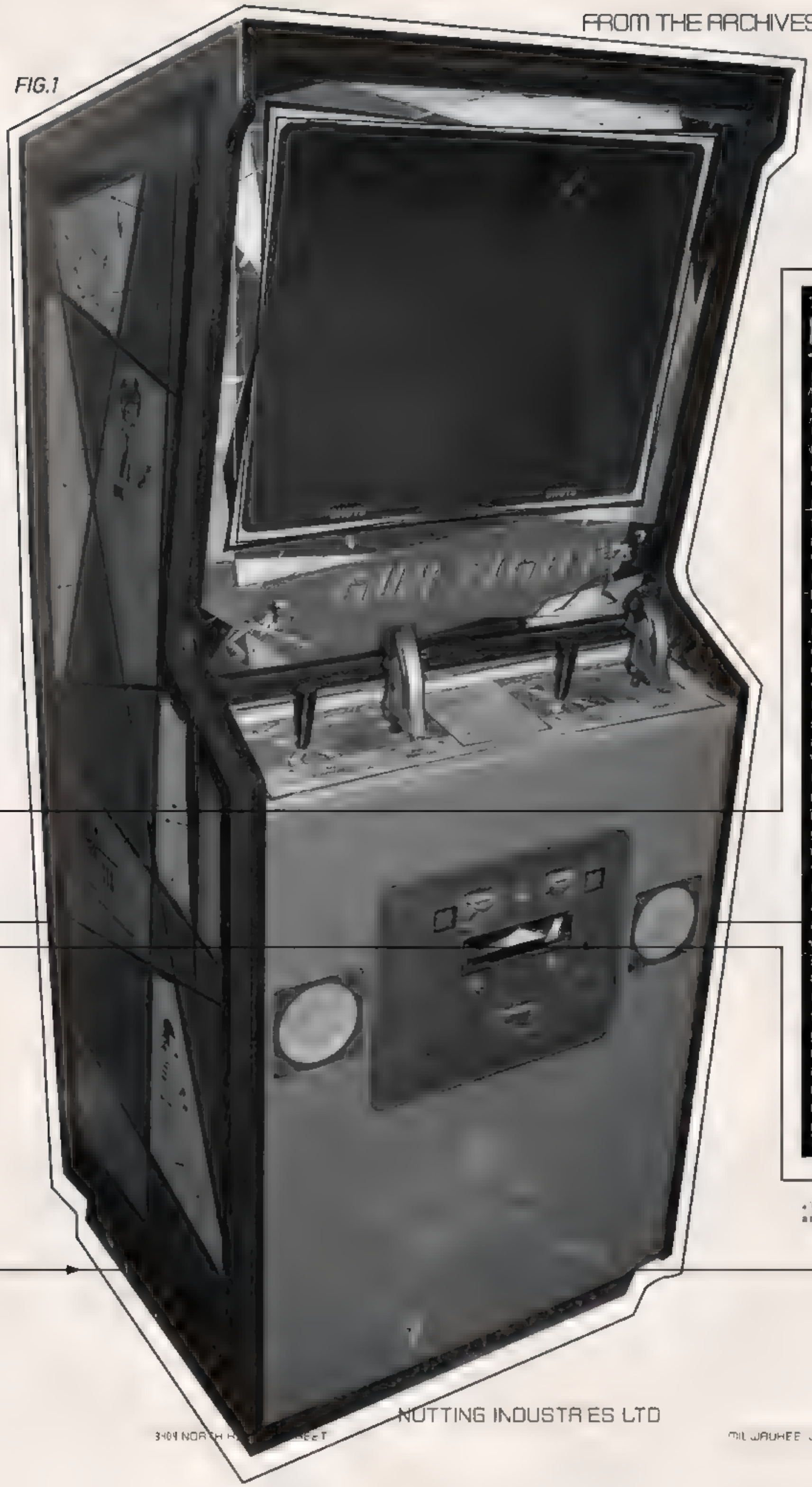
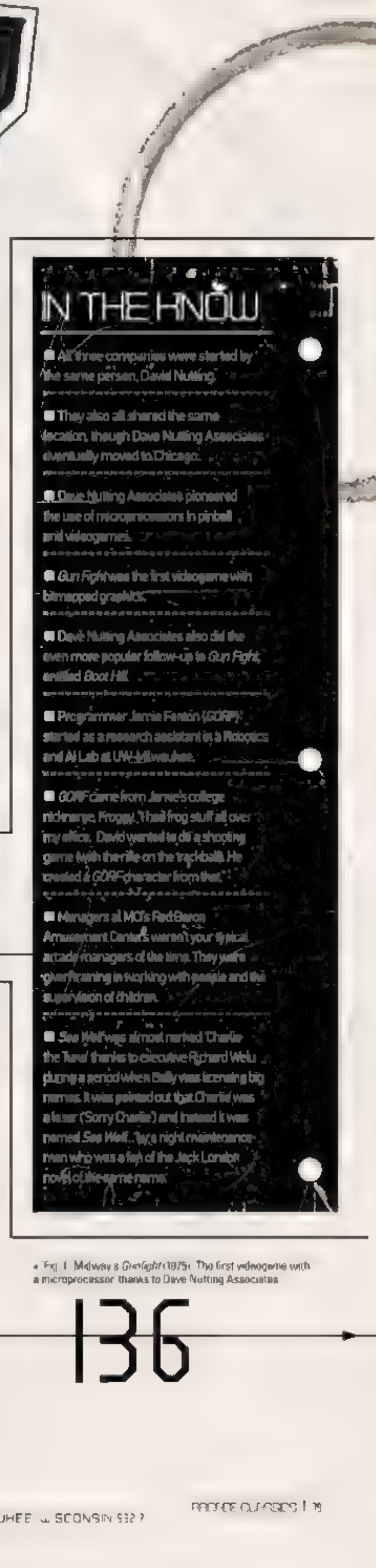
FIG.1





IN THE KNOW

- All three companies were started by the same person, David Nutting.
- They also all shared the same location, though Dave Nutting Associates eventually moved to Chicago.
- Dave Nutting Associates pioneered the use of microprocessors in pinball and videogames.
- *Gun Fight* was the first videogame with bitmapped graphics.
- Dave Nutting Associates also did the even more popular follow-up to *Gun Fight*, entitled *Boot Hill*.
- Programmer Jamie Fenton (*GORF*) started as a research assistant in a Robotics and AI Lab at UW-Milwaukee.
- *GORF* came from Jamie's college nickname, Froggy. "I had frog stuff all over my office. David wanted to do a shooting game with the rifle on the trackball. He created a *GORF* character from that."
- Managers at MCI's Red Baron Amusement Centers weren't your typical arcade managers of the time. They were given training in working with people and the supervision of children.
- Sea Wolf was almost named 'Charlie' the Tuna' thanks to executive Richard Weiu pitching a period when Bally was licensing big names. It was pointed out that Charlie was a loser ('Sorry Charlie') and instead it was named Sea Wolf... by a night maintenance man who was a fan of the Jack London novel of the same name.

• Fig. 1: Midway's *Gunfight* (1975). The first videogame with a microprocessor thanks to Dave Nutting Associates

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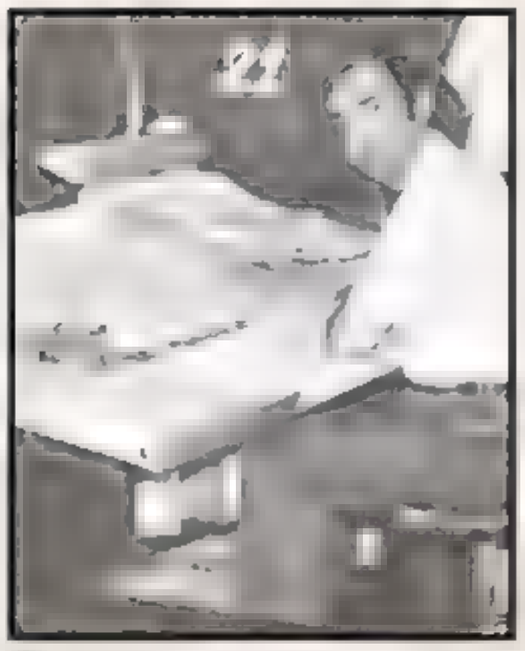
FIG.2



• Fig. 3. David Nutting working at the drawing board in 1972 at MCI.

FIG.3

•[Fig. 2] The original headquarters for all three companies at 3404 N Holton Street in Milwaukee, WI as it appeared in 1972 when it was known as MCI.

business. My expertise was design and engineering and Bill's was in marketing. So our verbal arrangement at that time was that I would design and engineer the final product and Bill would be the marketing and sales. I had a good friend who was an electronic engineer with Cutler Hammer. Harold [Montgomery] designed all the circuitry and designed the cabinetry and electromechanical devices like the projector."

The arrangement worked fine as the prototype was developed and tested successfully; that is until another relationship – one that usually takes a toll in any start-up – took precedence. Bill's wife Claire decided she didn't like the arrangement the couple currently had and played the divorce card, threatening to become another notch in a staggering statistic. Silicon Valley has the highest divorce rate in California, and California itself is 20% above the rest of the nation. Bill didn't want to become part of that significant statistic, so he called David and said he was going to manufacture the game in California and that David should shut down his operation. The news wasn't what David wanted to hear, but it was also obvious to David that the current working relationship he had with his brother simply wasn't going to work. He had already sunk way too much money into the operation to stop. So the brothers went their own ways and started their own companies to market the same game. Bill, under Nutting Associates, would be marketing it as *Computer Quiz* and Dave, under Nutting Industries, would be marketing it as *IQ Computer*. Setting up a manufacturing location at 3404 N Holton St in Milwaukee and hiring Eugene Wagner for marketing, David's game became an instant success (as did brother Bill's).

The US coin-operated industry was in the midst of a long battle against the stigma of gambling and organised crime, something it would not shed until the 1970s when videogames took over the industry. New York State even had a ban on pinball games that lasted for over 30 years, treating them no differently than slot machines or other gambling devices. By the late 1960s, the industry had organised under the Music Operators of America (MOA). The MOA's existence owes itself to the age-old battle against the US music industry that Steve Jobs more recently fought in the form of digital rights management (DRM) and 'renting' of digital music. That being the music industry has consistently tried to squeeze every nickel and dime out of people's enjoyment of music that they could. The MOA was started in 1948 by a group of influential jukebox distributors and operators to fight against the repeal of the jukebox royalty exemption. It eventually grew to become a powerful organisation representing the entire spectrum of coin-operated devices, including electromechanical pinball, pool tables, juketoxes and vending machines.

At the time of the release of *Computer Quiz* and *IQ Computer*, the MOA had been working hard to fight the typecasting of coin-operated machines, specifically pinball – a stigma that had severely limited the number of locations operators could place machines. For instance in Los Angeles, California, about six hours south of where Bill was living, pinball machines were banned until the mid 1970s. The Nutting brothers' games proved to be the right tool at the right time as operators used the machines to work their way into new locations. Both games could go

FIG.4

• (Fig. 4) A page from Bally's own project logbook showing some of the projects being pursued in 1978. A fair portion were by Dave Nutting Associates (listed as DNA).

everywhere because of their perceived edutainment value. Operators would get into a location with the game, establish a relationship and then slowly bring in pinballs, pool tables and vending. In a lesson learned by both Nuttings and later leveraged by Nolan Bushnell with his creation of the fake competitor Kee Games, the fact that there were two manufacturers of 'Quiz' games also awoke the marketplace and opened up more operators and locations. In the amusement industry at that time a great manufacturing run for a machine like a pinball was somewhere around 1,000 to 1,500. *Computer Quiz* had a run of 4,200 units and *IQ Computer* had a run of 3,600.

Over the next several years, David and Nutting Industries continued on the edutainment arcade game path using the same filmstrip technology, starting with a two-player version of *IQ Computer* called *Dual IQ Computer* and then various quiz replacement packs as well as another version of the unit, called *Golf IQ*. David also looked to diversify by hooking up with a manufacturer and distributor in London, England, creating a subsidiary to market non-coin-operated versions to educational institutions as Modec Inc. and by expanding into food service vending machines via some patents that Harold's father owned. It was the game offerings that needed to grow, however,

FIG.5

▸ (Fig. 5) The manual for Nutting Industries' *IQ Computer*. Together with its twin *Computer Quiz* by Nutting Associates, it opened up locations formerly closed to arcade games thanks to their seedy reputation over the preceding decades.

WHERE ARE THEY NOW?

David Nutting

Retired and living in Arizona, in 1984 David had moved to Colorado to study quantum physics. He's now the author of two books, the 2005 released *Language of Nature – Quantum World Revealed* and the 2012 *Secrets to a Creative Mind: Become the Master of Your Mind*.

Jamie Fenton

Jamie now lives in Sunnyvale, California. Spending the last 30 years working for a long line of game, graphic and software company start-ups, she currently works for Amazon's Lab 126 on the multimedia and performance teams for the Amazon Kindle and Kindle Fire tablets.

Alan McNeil

After creating the follow-up to *Berzerk*, called *Frenzy* for Stern Electronics, Alan also went on to do *Winter Games* and *Sub Battle* for Epyx, but has chiefly spent the last 30 years as a software developer writing apps across a plethora of platforms as a consultant.

"I wanted to be the industry leader and develop the first microprocessor pinball"

DAVID NUTTING ON OBTAINING INTEL'S FIRST MICROPROCESSOR DEVELOPMENT SYSTEM

and in 1969 they introduced *The Puzzler* designed by that same London firm. Ward Marty Johnson would replace Eugene as marketing head by the end of 1969, just as they were working on their most ambitious project. Initially titled 'Leisure Time Coin Game', by the time of its unveiling in October 1970 it was renamed *Sensorama*. The first arcade game to feature a professional sports tie-in, it was designed for placement at bowling alleys and featured 13 audiovisual bowling lessons given by pro bowler Dick Ritger.

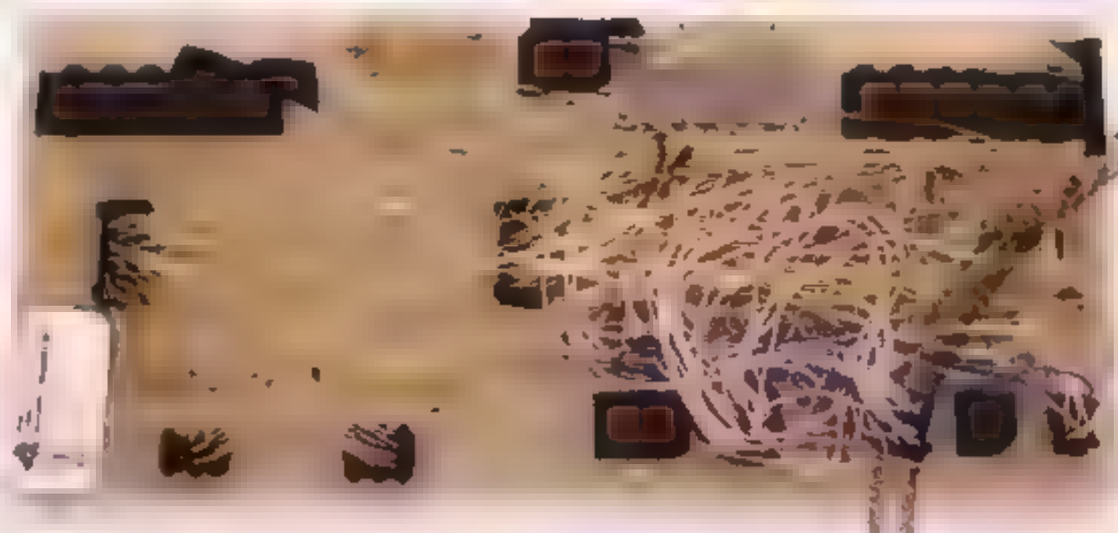
By 1970, though, it was clear that these educational arcade games were running their course, and with electromechanical (EM) arcade games already being dominated by the likes of Bally, Midway, Chicago Coin, Williams and Sega, a new format was needed. Brother Bill Nutting and his Nutting Associates got their new format in the form of video-display-driven arcade games when Nolan Bushnell had called up Bill's sales manager David Ralsun out of the blue. David was certainly open to the same synergy between new technology and games happening, and went so far as to place ads in local newspapers looking for people to submit ideas. However, overall he wanted to expand the projection technology into fully projected games based far away from the realm of quizzes. Looking to create a unique first-person experience with WWI airplane dogfights, in 1970 he began work on what would be the last game released under Nutting Industries, *Red Baron*. Using a pre-rendered animated film that functioned by jumping to different animations, much in the same way LaserDisc games like *Dragon's Lair* would some 12 years later, the player was given the sense of flying a WWI biplane into aerial combat. It was accompanied by recordings of actual machine-gun fire and plane engines along with haptic feedback in the form of the controls vibrating every time the plane's gun was fired. Unfortunately Nutting Industries ran into bad financial problems afterwards, forcing David shut it down and start over.

It was in the exact same location, and with some of the same people, but on paper Milwaukee Coin

FIG.6

▸ (Fig. 6) A special coin David Nutting had minted to give out at the Music Operators of America (MOA) show in 1968 – the main coin-op show in America.

FIG.7



▸ (Fig. 7) The processor card for the Flicker pinball machine that David and Jeff retrofitted to use a microprocessor.

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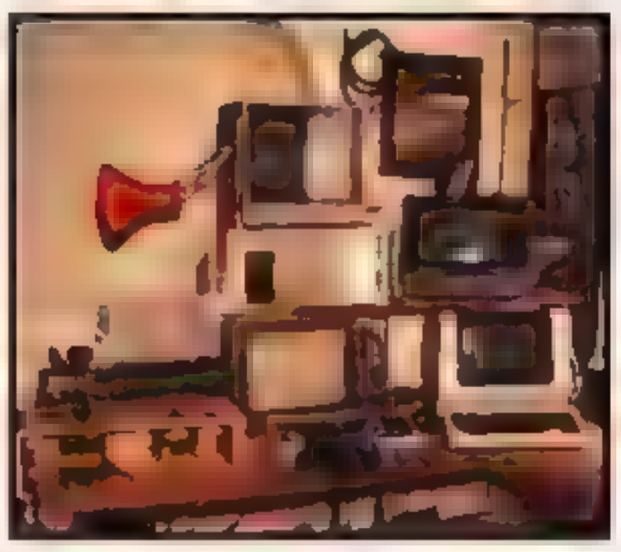
FIG.8

« [Fig. 8] David Nutting's brother Bill with his most famous product, *Computer Space*

FIG.9



« [Fig. 9] Jamie Fenton's video coin-op development station around the time of her games *GORF* and *Robby Roto*

industries (MCI) was a brand new company. MCI was carrying on where NI had left off and producing film-driven war-themed arcade games like *Blue Max*, *Desert Fox*, *U-Boat* and *Flying Ace*. However, it was the direction that David and the MCI board wanted to take in 1972 that really set MCI apart from other coin op companies. Firms at the time sold to distributors and what are called operators, the people who actually run the machine on location. At the time, most locations were usually arcades, bars and bowling alleys. Coin-op companies might put their own machines out at these locations for testing during development, but they never actually owned the locations.

One of MCI's customers gave it the idea to change all that. During the 1960s, Jules Milman and his company American Amusements Inc had sought to wipe out the negative image of arcades by designing a new breed that were to be placed at the then new concept of mega shopping centres in the Chicago area, more commonly known as shopping malls. Called Carousel Time, these family-friendly locations with carpeting and a ban on smoking and eating on the premises were far different than their seedy penny arcade counterparts. The success of Carousel Time led the MCI board to decide it should look into running its own mall-based locations featuring MCI games. Based on the successful *Red Baron* game (which had spawned the recent *Super Red Baron* follow-up by MCI), the first Red Baron Amusement Center debuted in the Milwaukee area Mayfair mall in 1972. Within the year they had grown to about seven locations in the Midwest. Nolan Bushnell also tried to duplicate the idea in 1973 with Atari's own mall-based arcades in the San Francisco Bay Area, such as at Bay Fair Mall, but it never quite caught on (at least not until he combined it with pizza to create Chuck E Cheese!). However, future David Nutting partner Bally did manage to succeed with its own in 1974... by purchasing American Amusements and rebranding it as the (more recently) well-known Aladdin's Castle.

With the success of the locations and the EM arcade game market starting to shrink during 1974, the MCI board wanted to concentrate its resources on the *Red Baron* locations. David, meanwhile, wanted to investigate the new form of electronics called microprocessors. The gateway into this futuristic world arrived via an Intel rep who had stopped by MCI to extol the virtues of the firm's soon-to-be-released 4040 4-bit microprocessor. He took new hire Jeff Fredenksen, who had experience programming a Burroughs mainframe computer, down to an Intel seminar in Chicago. "I wanted to be the industry leader and develop the first microprocessor pinball... convinced them to sell us one of the first microprocessor development systems," says David.

Developed under a consulting contract with Bally, the pinball project also led to the creation of the final Nutting company in this article, Dave Nutting Associates. David formed DNA, a game engineering firm, as a partnership between him and Jeff Fredenksen in the early summer of 1974. On 20 August, Bally in turn sent them two Flicker pinball machines (a game yet to be released) to retrofit into solid-state microprocessor-based prototypes as proofs-of-concept. Completed by September, the new system was demoed to Bally management at the end of the month and over the next several years became the blueprint for the burgeoning microprocessor-based pinball industry, whose machines were distinguished by their glowing LED score displays.

DEFINING GAMES

Gun Fight 1975

Released by Bally subsidiary Midway Mfg, it was originally titled *Western Gun* and released by Taito in Japan. DNA turned it into a microprocessor-controlled arcade videogame introducing software coding to the industry. According to David Nutting, its release caused a RAM shortage in other industries. It's also the first game to feature bitmap graphics, a concept only previously available in high-end graphics research systems at universities and corporations.

Sea Wolf 1976

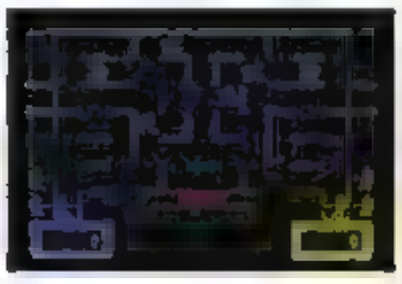
Featuring a life-size periscope, it's essentially a videogame version of Midway's earlier electromechanical games *Sea Raider* and *Sea Devil*. Its advanced sound effects and first-person environment proved a big hit in the mid-1970s and it remained one of the most popular games of the period until Midway released Taito's *Space Invaders* in 1978. That same year the sequel *Sea Wolf II* was also released, allowing two-player action with side-by-side periscopes.

Boot Hill 1977

The 1977 follow-up to *Gun Fight*, *Boot Hill* was programmed by Alan McNeil who later did the arcade classic *Berzerk* for Stern. Using dual joysticks to control the positions of the cowboy and his gun, it also features a colourful western backdrop that the game is projected onto via a reflective glass technique common in games of the period. Besides expanded gameplay, it also added a death song and burial of the player on the infamous Boot Hill.

GORF 1981

Jamie Fenton's classic shoot-em-up features several games in one, along with speech synthesis: "We used the TI speech chip – sometimes [it] would vocalise using garbage memory and it sounded like people speaking in tongues." With levels that included licensed versions of Namco's *Galaxians* and Taito's *Space Invaders*, that reason alone is why there are not many *GORF* ports out there, according to Jamie.



Wizard Of Wor 1981

David Nutting and Bob Ogden's game was inspired by the scene in *Alien*, where Sigourney Weaver is tracking the escaped alien via a small monitor. Using the same speech system and style of taunting as *GORF*, the standout feature is its very theme: the wizard. "When we put a voice into the machine, that got us into the mythology of who, exactly, was doing the talking. So we invented the Wizard. We used the Wizard to disrupt the flow of the game," explained co-designer Bob Ogden to Arnie Katz in 1982.

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It was right around this time that the duo pursued their greatest accomplishment, however. The Intel 8080 had been released that past April, and according to David, "As soon as we were able to acquire the 8080 processor we developed our videogame hardware based on a mass RAM system. For every pixel on the screen we had a dot in memory, giving us full control of the entire screen." What David is describing is the frame-buffer-based process now used by every videogame coin-op and console known to man: bitmapped graphics. Already in use in high-end graphics research computers at the time, David and Jeff were the first to see its potential in videogames. Video arcade games and home consoles in that period were manually generating hardware-based sprites (called 'stamps' in coin-op industry speak), even once microprocessor-based games became more common. So the process they introduced was truly far ahead of its time, enough so they knew they'd need to look for some programmers to hire for future projects.

Jeff had been attending UW-Milwaukee at the time he joined MCI and studying under Richard Northouse, a professor in the School of Engineering and Computing. Approached for some students skilled in programming, Richard contracted out two: Tom McHugh and Jamie Fenton. Recalls Jamie, "I entered the game business a little reluctantly. As the tales about Bally being part of the Mafia etc. Since I was in Milwaukee, I did not know about the Chicago scene. For a few weeks we worked for Richard and were later hired on directly to DNA. My first assignment was 'Mirco Pin'. Mirco was a pinball company that Jeff and David pursued a relationship with independently of Bally. It was like the Bally Fireball but had more going on. After that I got to work on a blackjack game on the videogame hardware and that really impressed David. I remember the place [where DNA was located] vividly. It was a commercial space shared with the Red Baron arcade game chain, and there were a lot of games to play with. You just wandered around with an extension cord."

According to David, the first game they started for Bally subsidiary Midway on their new hardware was a baseball game (eventually released as *Tornado Baseball*), but it would be Tom McHugh's project that would hit the market first for Bally in November 1975. *Gun Fight*, Midway's licensed version of Taito's *Western Gun*. In a process similar to what they had done for the Flicker pinball machine, the game was gutted and retrofitted with the bitmapped microprocessor-based system they had designed. With *Gun Fight*, the video coin-op industry had just met its future. And as Dave further notes, it wasn't the only industry to be affected. "Our system used a frame buffer of RAM that would write to the CRT. RAM in 1975/76 was in short supply. In order to get a good price on RAM, Midway had to commit over three million dollars on their first release. This order consumed over half of all RAM in production in the world at that time, causing great shortages to other industries." Also according to David, Taito turned around and copied their 8080-based hardware for its game *Space Invaders*.

From there, the now classic *Sea Wolf* (by Tom) and the racing *280-Zzzap* (by Jamie) games followed, along with the previously mentioned *Tornado Baseball*. The string of hits led Bally to buy out DNA outright, and the group moved down to Chicago to essentially become Bally/Midway's research and design wing in the same way that Cyan was for Atari. It was followed later in the year by the start of the design of Bally's simultaneous entry in to the new home computer and programmable console markets: The Bally Home Library Computer. Created as a full-colour bitmapped personal computer and gaming console (the first bitmapped frame-buffered console, in fact) that could also be leveraged in new coin-op designs, it saw a mail-order-only release in September 1977, with wide release in 1978 as the Bally Professional Arcade. More hits followed for DNA, most notably *Wizard Of Wor* and Jamie's smash game *GORF*. However, the video coin-op industry went through a crash starting in '82, causing many firms to either downsize or leave all together. Sadly, DNA didn't survive and was shut down by Bally in early 1984. Interestingly though, this was just as Bally was acquiring the game firm Sente (founded by several ex-Atari coin-op engineers and helmed by none other than Nolan Bushnell), which would serve the very same purpose as DNA over the next four years. ✱

Special thanks to Keith Smith.

"This order consumed over half of all RAM in production in the world at that time"

FIG.10 DAVID NUTTING REVEALS HOW GUN FIGHT'S PRODUCTION CAUSED A GLOBAL RAM SHORTAGE

▪ Fig. 10: DNA developed this hybrid game console and computer system in 1975, released in 1977. It was later renamed the Bally Professional Arcade and then Astrocade.

FIG.11

▪ [Fig. 11] The back of the microprocessor-driven Flicker pinball machine's backglass showing the modifications Jeff and David made to support LED-based scoring: the first of its kind.

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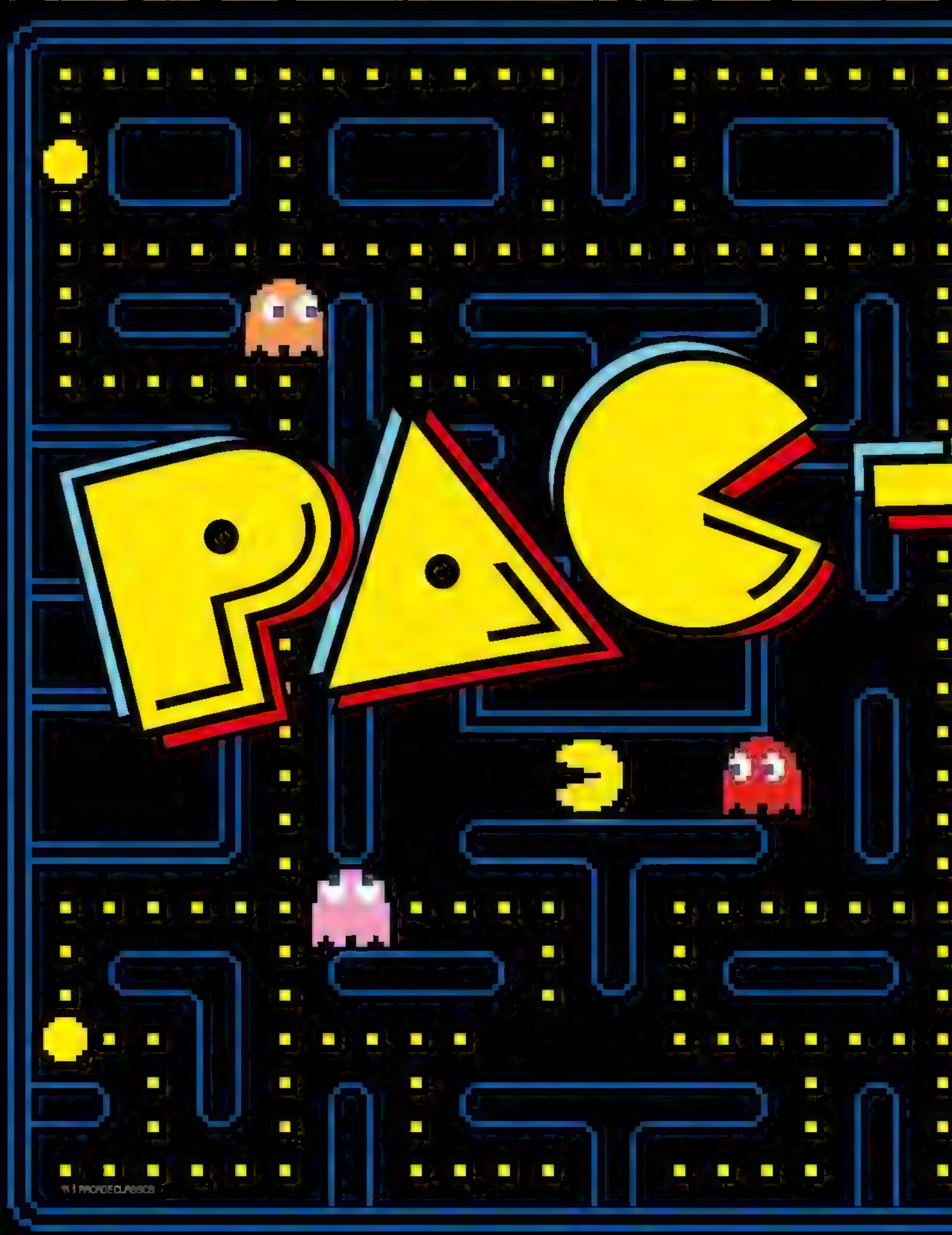

PAC

CRAIG GRANNELL TALKS TO **TORU IWATANI** ABOUT HOW HE CREATED THE MOST ICONIC CHARACTER IN VIDEOGAMES HISTORY, DEVISED ONE OF THE MOST ENDURING AND COPIED GAME FORMATS, AND HOW HE REVISITED HIS CREATION FOR XBOX 360

With modern-day game characters often being designed and scripted to ape Hollywood movie stars, it's pleasing to note that a yellow circle with an insatiable appetite remains the most enduring videogaming star to date. After all, which gamer hasn't played some variant of *Pac-Man*? According to a May 2006 report by the Davie Brown Celebrity Index (dbireport.com), which scores celebrities to evaluate potential product spokespeople, *Pac-Man* was recognised by 94 per cent of US consumers, outstripping even *Mario*. *Pac-Man*'s appeal is, ironically, akin to Hollywood heavyweights like Tom Hanks.

Part of this appeal is no doubt down to the fun, peaceful nature of Pac-Man and his actions. He explores a simple maze, munching dots, pursued by a quartet of cartoon ghosts. When Pac-Man eats one of the maze's four power pellets, the ghosts turn blue and flee, having suddenly become edible and decidedly non-threatening. However, even when a ghost is consumed, its eyes 'escape', hastily retreating to the central ghost pen, whereupon it's reborn.

Toru Iwatani with an altogether subtler version of Blinky/Akabei, along with similarly soft versions of Pac-Man.

This gentle, good-natured gameplay was no accident, as the game's designer Toru Iwatani explains. "In the late Seventies, videogame arcades, which in Japan we call 'game centres', were just playgrounds for boys, and the only videogames on offer were brutal affairs involving the killing of aliens," he remembers. "My aim was to come up with a game that had an endearing charm, was easy to play, involved lots of light-hearted fun, and that women and couples could enjoy."

Iwatani started thinking about videogame ideas in which the key word was the verb 'eat'. And, yes, the pizza rumour is largely true – suitably, while at a lunch, a fast-food favourite forever changed the course of gaming history. "With 'eat' established as the key word, a shape caught my eye," recalls Iwatani. "I had ordered a round pizza, and it was missing a piece." In a 'eureka' moment, Iwatani says, "the shape of what is now Pac-Man flashed through my mind."

Even in those early gaming days, videogame characters had a little detail, but Pac-Man was forever destined in his first

IN THE KNOW

- **PUBLISHER:** NAMCO/MIDWAY
- **DEVELOPER:** NAMCO
- **RELEASED:** 1980
- **PLATFORMS:** ARCADE, VARIOUS
- **GENRE:** MAZE GAME

HACK-MAN

With its efficient, simple gameplay and aesthetics, *Pac-Man* was popular fodder for the hacking brigade. Basic hacks involved minor gameplay tweaks, such as speeding things up, while slightly less basic hacks messed about with the maze, graphics and sound, adding to the original game's pristine polish a veneer of sticky and semi-random digital jam. The hideous *Joyman*, with its ghastly audio and broken maze layout, most notably kicked *Pac-Man* in the head with all the subtlety of a size-ten boot.

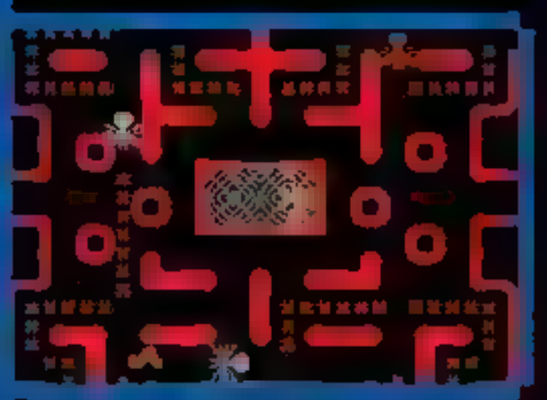
The most effective hacks are those that respect the original formula – *Hangly-Man*'s amended mazes – but *Gil's Piranha* is an exception. Removing the maze and shifting the setting to a claustrophobic underwater cavern – the eponymous piranha pursued by ravenous octopuses – gives the game an edge in terms of focus and originality that other hacks typically lack.

incarnation to remain a yellow disc with a basic mouth, like an incredibly simplified version of Iwatani's lunch. He notes that some suggested at the time that other components should be added, such as eyes, but then there would be no end to the additions. "As design concepts, both Pac-Man and the ghosts have a simplicity and endearing charm," Iwatani says of his decision to keep the graphic design streamlined, also suggesting that the visuals of the game helped it appeal to female gamers of the day.

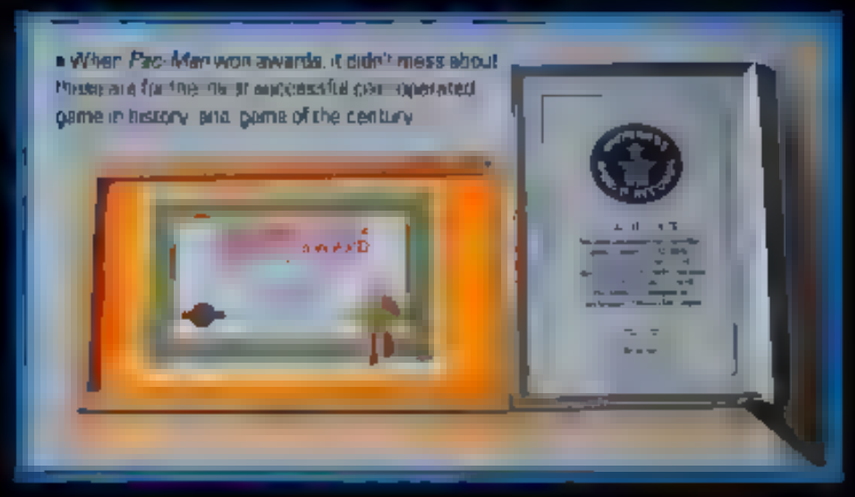
The elegant clarity of the character design also influenced the game itself. The food for Pac-Man to eat was initially strewn all over the screen, but Iwatani was keen to ensure gamers would immediately know what to do. "I wanted to simplify gameplay operation, and so the idea occurred to me of constructing a maze in which movement was restricted to the four basic directions – up and down, left and right," he says. With this structure in place, the game's objective became more obvious, and the lead character soon gained his moniker, 'Pakku Man', based on Japanese slang 'paku-paku', which describes the sound of the mouth while eating. (The original game's title subsequently became *Puck Man*. The US publisher, Midway, renamed it *Pac-Man* to stop wily hoodlums amending the 'p' in 'puck' to an 'f'.)

With the game's basic content dealt with, Iwatani realised it wasn't yet much fun, and so enemies were added to the mix, providing tension and excitement, and making it a challenge for players to grab food from the maze. Unusually for the time, Iwatani not only developed rudimentary artificial intelligence for the ghosts, but ensured each one had its own personality of sorts, due to moving and attacking Pac-Man in its own way. "The adversarial TV cartoon *Tom And Jerry* helped shape the relationship between Pac-Man and the ghosts," recalls Iwatani. "Had the programming been such that the four ghosts constantly attacked Pac-Man's present location according to the same algorithm, the ghosts would look like a string of beads. Where's the thrill in that? So I introduced AI-type algorithms that had the ghosts coming at Pac-Man from all directions."

And so we were introduced to Blinky, Pinky, Inky and Clyde (Akabei, Pinky, Aosuke and Guzuta in the original Japanese release). According to Iwatani, the ghosts attack in waves, before dispersing and attacking again, which gives the player some regular breathing space and appears more organic than the kind of incessant attacks that had plagued earlier arcade games like *Space Invaders*. (Over time, these waves are harder to identify, and the ghost attacks become swift and relentless, somewhat contradicting Iwatani's desire for a non-stressful game, but providing a necessary long-term challenge for seasoned players.) Although gamers often disagree with exactly how the algorithms work in practice, Iwatani has in the past stated that Blinky is designed to chase Pac-Man, but that Pinky's goal is to aim just in front of Pac-Man, hence why the two often seem to 'sandwich' the hero. The movement of Inky and Clyde is a lot more random, the end result being that Pac-Man is pursued in a



> **"I designed the game so players of any age and either sex could play it straight away, without reading a game manual"**
> TORU IWATANI



PAC-MAN MILESTONES

A brief overview of notable arcade-based

MS PAC-MAN (1981)

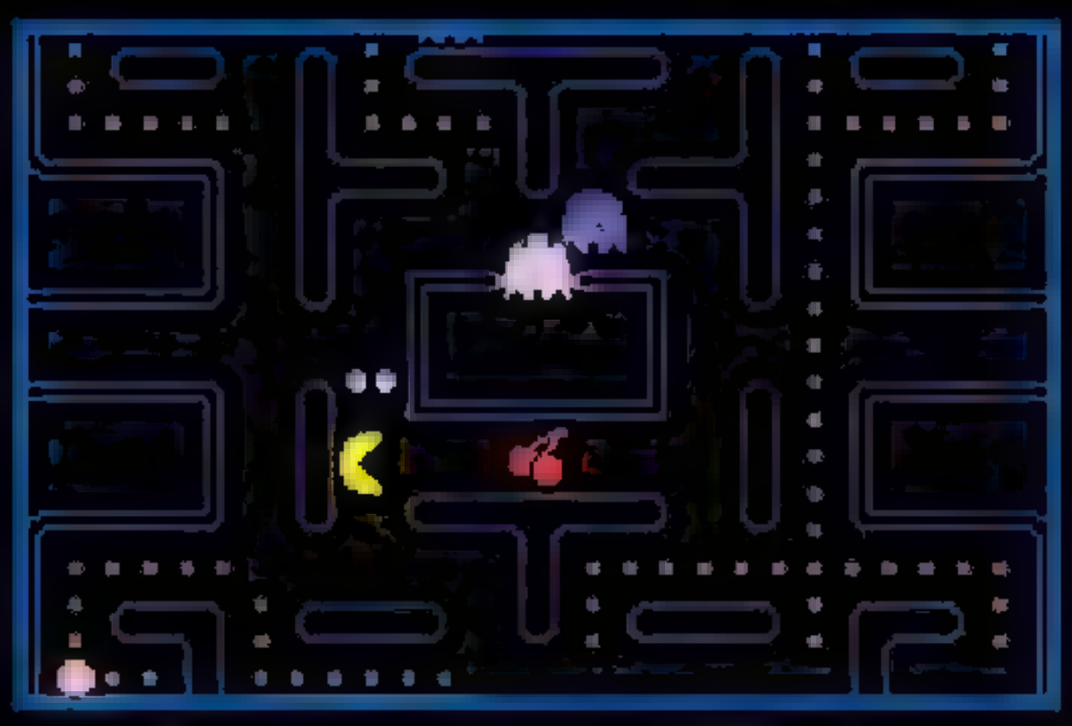
Fed up waiting for Namco's *Pac-Man* sequel, US distributor Midway struck a blow for gender equality by releasing GCC's *Pac-Man* hack. Along with speeding up the game and amending the hero, *Ms Pac-Man* includes new mazes, more varied ghost behaviour and moving fruit.

SUPER PAC-MAN (1982)

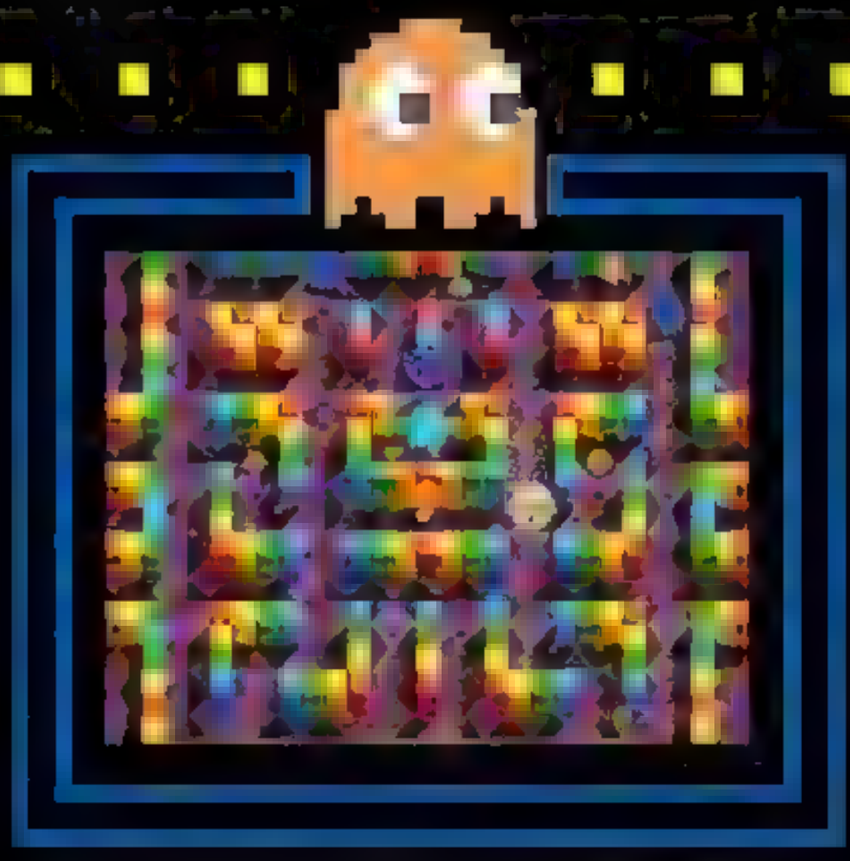
Namco's *Pac-Man* sequel disappointed many outside of Japan, due to the fact that the gameplay was substantially altered. You still clear mazes, but munch targets behind gates that open when keys are guzzled. A 'super power dot' makes Pac-Man grow Hulk-like, to devour everything in his path.

JR. PAC-MAN (1983)

Midway again did the naughty, creating this effort without permission, and Namco terminated Midway's licensing agreement. Namco still doesn't recognise the game as official. With its scrolling levels obliterating the original's tightly honed strategic gameplay, it's easy to see why.



» A rampaging *Pac-Man* on level one devours a ghost before laying eyes on the cherries. Meanwhile, a resurrected Pinky sets out for revenge.



» *Pac-Man Arrangement*, released in 1996 as part of *Namco Classics Collection Vol.2*, is a successful *Pac-Man* update, with pretty graphics and interesting new features.

DEVELOPER HIGHLIGHTS

LIBBLE RABBLE! (PICTURED)
SYSTEM: ARCADE
YEAR: 1983

PAC-LAND
SYSTEM: ARCADE
YEAR: 1984

RIDGE RACER
SYSTEM: ARCADE
YEAR: 1993

Eighties, he was involved in both *Pac-Land* and *Pac-Mania*, with the former being his favourite. "It pioneered action videogames in which the scene flows horizontally. According to its creator, Shigeru Miyamoto, Nintendo's *Super Mario Bros.* was influenced by *Pac-Land*," he says, proudly.

However, it was during 2006 that Iwatani finally got the chance to both return to *Pac-Man*'s roots and design a brand new engaging, modern-day evolution of his original creation. Instead of the arcades, the chosen platform was Xbox Live Arcade, and the game became *Pac-Man Championship Edition* (*PMCE*).

"The time was right for a next-generation *Pac-Man*, because the Xbox Live Arcade environment supports real-time competition with score-ranking via the internet, and improved design through its hardware specification," explains Iwatani about the origins of the highly acclaimed game. "My aim with the game was to achieve legitimate evolution, with simplicity of game design and absence of the superfluous as my guiding principles, because, in my opinion, few players look for complexity in gameplay."

Guided by the same ground rules that defined *Pac-Man* – immediacy, simplicity, immunity to language and cultural differences, and "that sense of wanting to play and have fun, which is what the world's videogame players are looking for" – *Pac-Man Championship Edition* broadly retains the original's core gameplay, tasking the player with navigating a maze to eat dots, fruit and power pellets and avoiding roaming ghosts.

However, some major changes were made to the formula, in order to keep the game relevant and ensure it was more than just the original game reskinned.

Rather than the player having to clear a maze to proceed, *Pac-Man Championship Edition* plays like a time-attack game, and the player has a strict time limit in which to score as many points as possible. As with *Pac-Man*, this is done by consuming dots and 'scared' ghosts, but the longer you stay alive, the more each dot is worth (and the faster the game becomes). Also, the maze is now split in half. Clear one half of dots and bonus fruit appears in the other; eat said fruit and new dots are spawned in the previously cleared half. "The horizontal maze came about due to the prevalence of widescreen displays," explains Iwatani, noting that the split-maze device also creates non-stop action, unlike the original *Pac-Man*, which 'interrupts' players upon a level's completion. "And the timeout feature increases the sense of speed and excitement in the game, making it a very thrilling experience to play. Also, score ranking via the internet provides competition, which has been a great success."

Iwatani adds that one of the key aims was to have people worldwide competing, the logical modern-day equivalent of Eighties' high-score table on the original *Pac-Man*. It works brilliantly, ensuring you'll always want to return for one more game.

Perhaps ironically, *PMCE* was, unlike *Pac-Man*, critically acclaimed right from the start. 1UP.com ranked it alongside *Geometry Wars* in terms of a classic game format being reworked, noting that

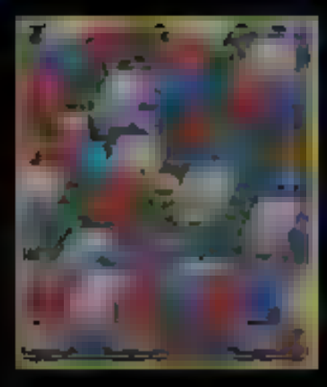
Pac-Man follow-ups

PAC & PAL (1983)

Here, Namco again moved further from the original *Pac-Man*. Ghosts can only be stunned rather than eaten, and now flipping cards opens gates to reveal items. The 'Pal' of the title is the infuriating Miru, who makes off with your bonus items, taking them to the inaccessible ghost pen.

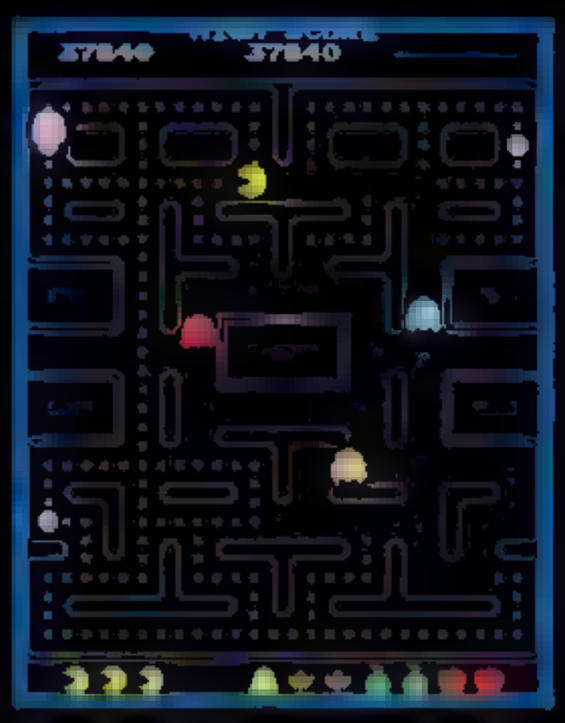
PAC-LAND (1984)

Pac-Man finally left the maze, gained legs, arms and a face, and was tasked with battling through this early side-scrolling arcade game, its levels peppered with *Pac-Man* imagery. Although repetitious, the game is initially fun and it's more successful than Namco's previous two efforts.

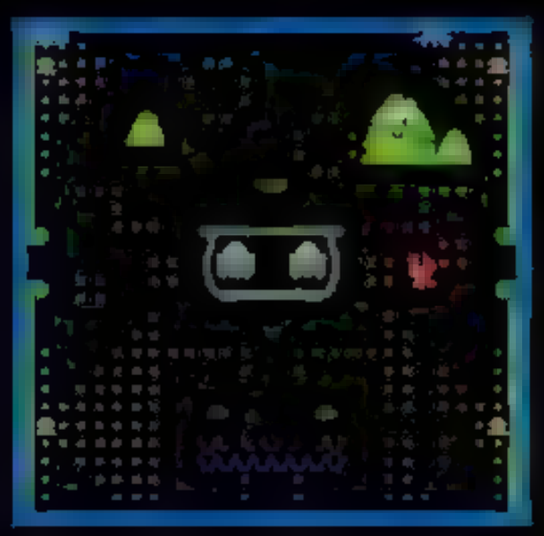


PAC-MANIA (1987)

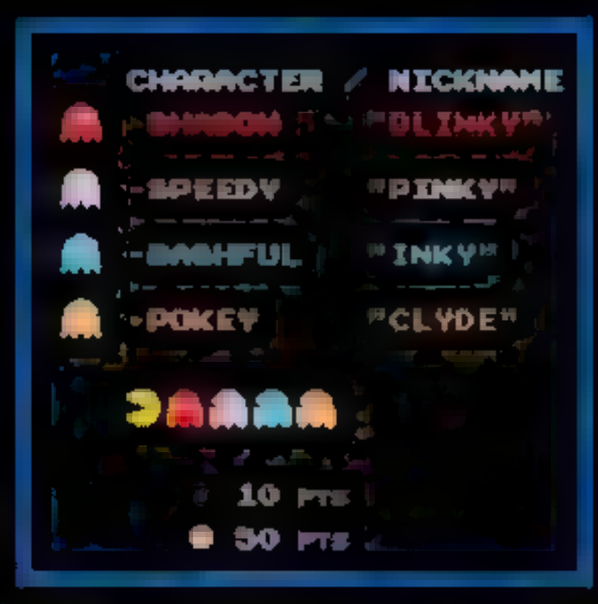
Pac-Man finally returned to his roots in *Pac-Mania*, although as you can see his surroundings are markedly different. The isometric maze scrolls, and the ghosts tend to roam in packs. Although, in Pac-Man's favour, he can now jump and he occasionally finds bonus items that speed him up.

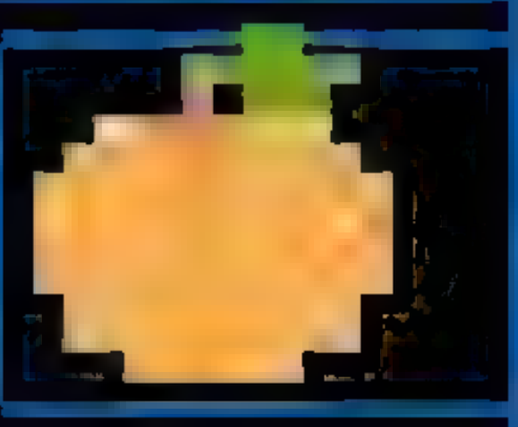


» Several levels in and the ghosts become faster – you have little time to eat them after eating a power pellet.



» *Piranha* is a decent *Pac-Man* hack, removing the maze and thereby creating a different and tougher game.





> "Pac-Man's guiding principle is 'fun first'" TORU IWATANI

it was "a lot more than just a tarted-up *Pac-Man*." Joystiq's Jared Rea blogged: "A better name for it would have been *Pac-Man 2*, [...] a name that gets the point across that *Pac-Man Championship Edition* is the first true sequel to the game since *Ms Pac-Man*."

Iwatani modestly suggests that some of the acclaim might be due to low expectations for a *Pac-Man* game, and says the response of game players exceeded his expectations, citing the many internet-based critiques that offered "splendidly glowing evaluations". (Happily, and despite claims to the contrary, Iwatani also assures us that *PMCE* is not necessarily to be his swansong, since he continues to be involved in videogame production. Although at this point in time (2015) he's yet to have been significantly involved in a new game in the way he was with PMCE. He's not left our thoughts completely however, as he made a cameo appearance alongside Pac-Man in Adam Sandler's recent movie *Pixels*.

With 30 years of experience in videogames design, including the most iconic games character of them all, Iwatani is now, perhaps suitably, involved in teaching aspects of videogames design to students at Tokyo Polytechnic University, along with conducting research into games for social purposes. Although *Pac-Man* has always remained popular throughout the years, we wondered what Iwatani made of the games industry's tendency towards over-complication and movie-like games, along with the relatively recent resurgence in retro-orientated titles. "We should carefully gauge the preferences of light users, who normally don't play videogames, and the preferences of videogame aficionados, and then design products to suit each," he suggests, thoughtfully. "A sumptuous party dress may be of limited practical value in daily living, and the same applies to over-elaborate videogames in the videogame market." On retro titles – 'pick up and play' games popularised by the internet, XBLA, Nintendo DS, Wii and iPhone – Iwatani thinks this might be a sign that the actual game, rather than aesthetics, is again becoming the main concern for developers: "Hardware specifications 20 or 30 years ago restricted powers of expression, and so the rules of the game were decisive in attracting users. The current boom in retro games is evidence of a universal fascination with game-playing itself."

We finish off the interview by returning to the subject of *Pac-Man*. We're keen to know how Iwatani feels to be the designer behind a game that almost everyone knows – one that perhaps only *Tetris* can challenge in terms of its incredible widespread appeal? "People view the work in different ways, from different viewpoints. Some see it as being broad and shallow. For others, it is narrow yet deep and praised," considers Iwatani. "What is gratifying about this is that people find such different reasons for loving it." And as a final word, Iwatani reckons that there are still things his 35-year-old creation can teach modern-day games designers, developers and publishers. "*Pac-Man* is the perfect videogame because its design gives top priority to the player and to a spirit of service," he says. "Its guiding principle is 'fun first'. This concept is in my view invincible and what I look for in the videogame creators of today, that they understand the importance of capturing people's hearts."

With grateful thanks to Tetsuya Hayashi for invaluable assistance in realising this interview.

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SHI

Star Wars

- ATARI INC
- ARCADE
- 1983

Like many adult males my age I'm a bit of a self-confessed *Star Wars* fan. It's not that I think they're also absolutely wonderful films – the taste for *Empire Strikes Back* excluded – it's just that they managed to connect with me in a way no other movie has since managed.

Playtime at school would be spent arguing over who got to play Han Solo (I was never that keen) as home turned into inevitable re-enactments of key sequences from the trilogy, while my back garden was littered with toys.

Thank God then for the Atari release of *Star Wars* in 1983, as it was given a further outlet for all my well-honed fantasies. And really, this was the first *Star Wars* video game that honour goes to the Atari 2600's plodding *The Empire Strikes Back* but it was the first game to fully capture the joy of the *Star Wars* films and indeed stop.

Everything about it was perfect. The sit-down cabinet felt with its full immersion like you were strapped into your very own X-wing fighter. The controls were incredibly precise (although you may struggle a little with them nowadays) and the aesthetics were already. TIE fighters raced across the screen, Tie-nails burned towards you at frightening speeds and the dreaded Death Star loomed ever closer. Add in the wide variety of sounds effects straight from the film and some of the best digitised speech around and the end result was a truly magical experience that ate up your credits at a truly alarming rate.

What made *Star Wars* so great was the sheer amount of action that was going on. While the aerial dogfights with opposing TIE fighters were fun, it was the ground-level run down the Death Star's trench that proved to be the game's real trump card. After reliving the nerve-shattering trips to the school playground, the ability to finally participate in the real thing (or as close to it as possible) was a revelation. Thank goodness we now have a stand-up cabinet in the office. ★

BurgerTime

A combination of Donkey Kong and the fast food explosion of the Eighties, BurgerTime hit arcades in 1982 and gave hungry gamers the chance to try their hand at high-pressure short-order burger-flipping. Let's get cookin'!

Anyone who stepped into an Eighties arcade will freely tell you one thing about the games that resided there: they were hard as nails. These were machines designed to remorselessly extract every spare piece of change from a teenager's pocket, and welcome them into a world of bright colours and frustrating, 'just-one-more-go'-style gameplay. The toughest games would have you in tears, distraught for not getting past that boss at the umpteenth attempt. They'd have you on your knees as your avatar bit the dust time and time again, smote repeatedly by a grossly unfair random bullet or missile. Some games frustrated you. Some games drove you mad. And then there was *BurgerTime*.

Strangely, *BurgerTime* (originally titled *Hamburger*) was not created in the pits of Hell, but in the offices of arcade giant Data East. The game used Data East's proprietary and interchangeable Deco Cassette system and came on a simple audio cassette, which was loaded into a base cabinet by the machine's owner. The system was notorious on two counts: the unreliability of the audio cassettes (and the fact they had to be 'loaded' ▶

Chef Pepper gets caught by a Mr. Hot Dog.

DEVELOPER Q&A

We talk to Ray Kaestner, programmer of the superb Intellivision version of BurgerTime

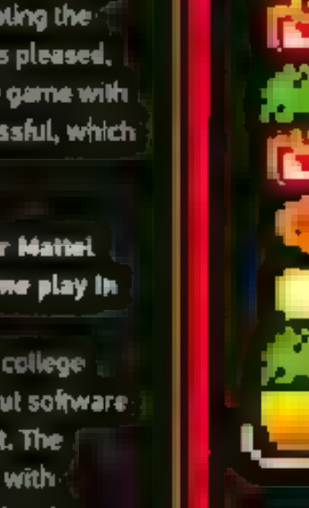
Were you familiar with the arcade game?
Not initially, since it was developed in Japan and at the time it didn't have much of a following in the US. When I got the assignment I had a crash course in it. We had no access to the original code, not that it would have done us much good, since the architecture would have been so different to the Intellivision.

How did you prepare for the conversion job?
By playing the game a lot and getting familiar with the different screens and motions of the enemies. Some of the other Intellivision coders played it a lot and got proficient at it so I got a good chance to observe the game without worrying about surviving.

Any big issues during development?
The screen resolution for the Intellivision is much lower than that of the arcade game, so making mazes that captured the mechanics of the original made the job interesting. We had to make compromises, like only on the first screen can you see the full burgers at the bottom of the screen, and even then we didn't show some ingredients in order to save screen real estate. Other than that, just things like the Intellivision being limited to eight moving objects, so the animation of the dropping burger pieces had to be done in the background. I was concerned it wouldn't looked smooth enough, but it turned out okay. Plus we were under time pressure, I started work on the game in September, and was scheduled to get married in December! Fortunately I got off to a good start and finished the main programming a month before my wedding day, which left plenty of time for tuning and testing.

How well do you think you did?
I was very pleased. The extra time for tuning made a huge difference and Karen Nugent did a great job on the graphics and character animations. Bill Goodrich also did well translating the music and sounds. Mattel was pleased, too – it invested heavily in the game with advertising. And it was successful, which was very satisfying.

What was it like working for Mattel and what role did *BurgerTime* play in your career there?
Mattel was my first job out of college and I learned much there about software architecture and development. The constraints we were working with then taught us to be very efficient in how we wrote software and also gave us focus on simple but fun gameplay. And working on *BurgerTime* gave me opportunities to work on more fun projects at Mattel such as the *Masters Of The Universe* game and the Intellivision III Master Component.

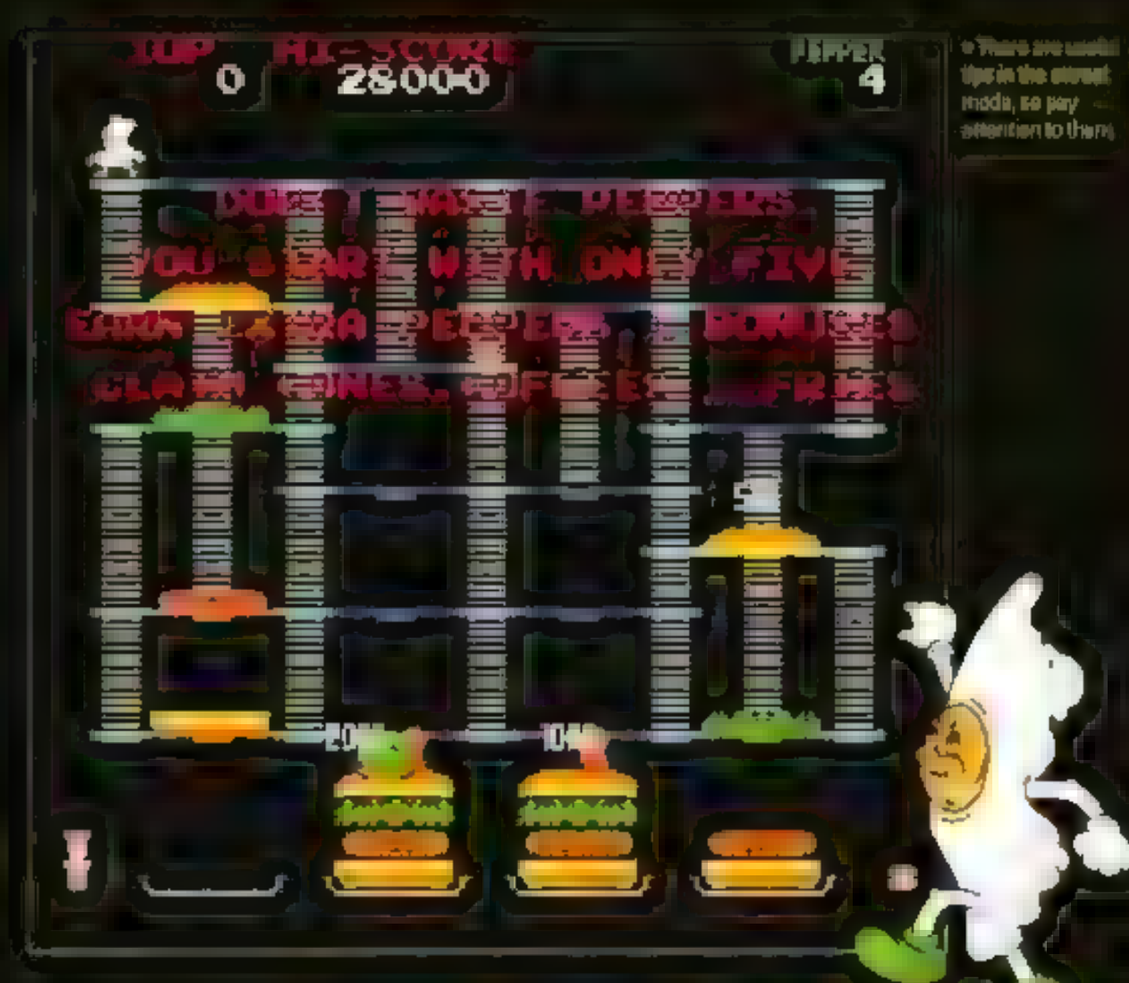


"Despite its difficulty, BurgerTime proved to be very popular in arcades"

Data East kindly reveals the best ways to score points during play.

up every morning) and, most notably, the difficulty level of the games that used the system. Later versions of the game came on its own dedicated arcade board.

BurgerTime throws the player into the heated cauldron of a fast food restaurant kitchen. Your name is Chef Peter Pepper, and the object is to create copious amounts of juicy burgers for a mass of hungry customers. This is no ordinary kitchen, however. Many of Chef Pepper's ingredients have come to life and are stalking him as he goes about his work. One touch from a Mr. Hot Dog, Mr. Egg or Mr. Pickle will put the hard-working cook on his arse and one of his three lives is lost. The parts of the burgers themselves are spread around a selection of nefariously-designed mazes. Chef Pepper must negotiate his way around, avoiding the deadly enemies and 'walking over' the ingredients. These will then fall to the level underneath, knocking down any items laying directly below. When all the ingredients are formed at the bottom of the screen



• There are useful tips in the street mode, so pay attention to them.

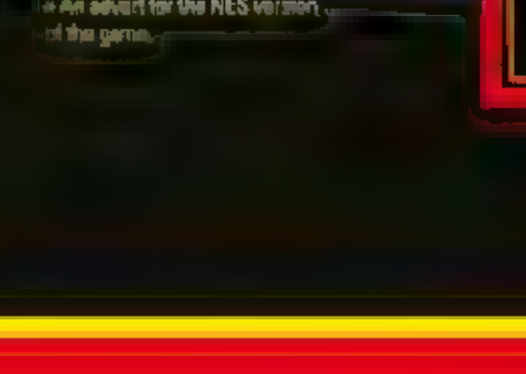
and the burgers are complete, Chef Pepper allows himself a little celebratory dance before it's off to the next level and more baying, hungry customers.

In essence, *BurgerTime* is ridiculously simple. There are no power-ups and Chef Pepper cannot jump. In fact, all he has to defend himself is a pepper shaker, a quick dash of which temporarily stuns the pesky hostile foodstuffs. Enemies can also be taken out (again temporarily) by dropping ingredients on them or walking over an ingredient with an enemy on it. The latter yields an extra bonus and is the best way to rack up a decent score. Once all the burger patties, tomato and lettuce have dropped to the bottom of the screen, the burgers are ready and it's off to the next level. Each screen looks deceptively easy, with some requiring many burgers to be made, others containing multiple dead ends and choke points where it's easy for a careless Chef Pepper to get trapped by two enemies. Bonus items, either a cup of coffee, fries or ice cream cone will appear periodically. Snare one of these and Chef gets an extra pepper. But there's little respite as any vanquished enemies soon return to the fray.

Like many of its arcade peers, *BurgerTime* has no actual ending; instead the game just loops around the same set of screens. However, while the number of enemies remains fairly constant, their speed does not. From around level 12 onwards, Mr. Egg, Hot Dog and Pickle gain fractional extra pace until by level 22 they are beginning to outpace the rotund cook. Any player who can negotiate level 25 onwards with the food running amok at great rapidity, deserves the greatest of respect.

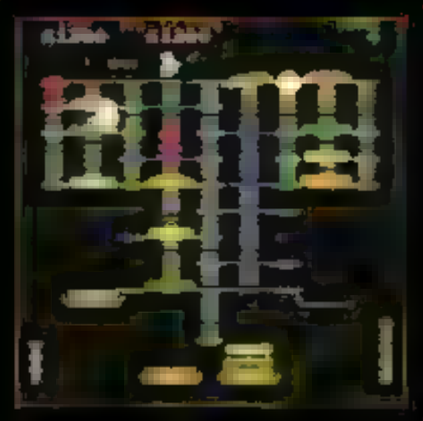
Yet despite its difficulty, *BurgerTime* proved to be very popular in arcades. The US and European versions were licensed by Bally Midway and identical to Data East's save a few changes to

• For the home versions, Mattel employed an extensive advertising campaign.



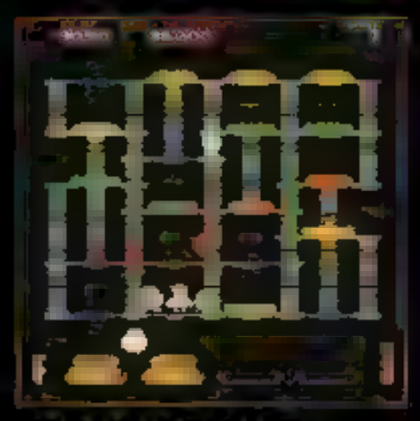
• An advert for the NES version of the game.

BEAT BURGERTIME



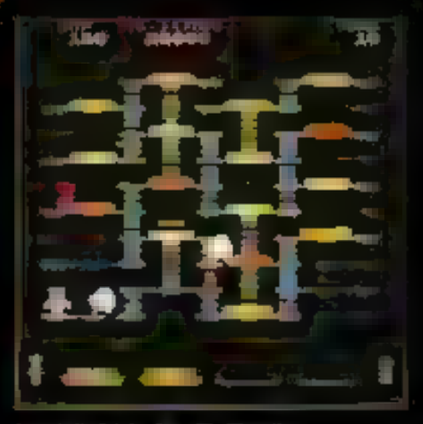
TAKE OUT THE TOP BUNS

■ Unless you happen to be passing them, it's a good idea to ignore the burger fillings that are scattered around and head for the top buns. Taking these out knocks down all the ingredients below them and saves a hefty amount of time.



TREASURE THAT PEPPER

■ Unlike in most cookbooks and kitchens, pepper is in very short supply. Only use it when you have to, such as when you are stuck between two enemies or in a tight corner. Make a beeline for the bonus items as they give you an extra pepper.

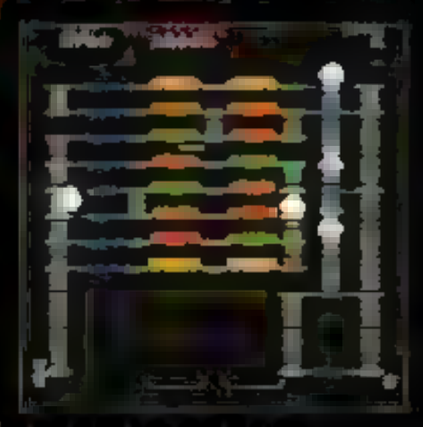


WATCH OUT FOR DEAD ENDS

■ Many of the levels contain burgers to the extreme left and right, and often these have no ladders on their far platforms. When knocking down these items, make sure you are well clear of enemies that could potentially trap you.

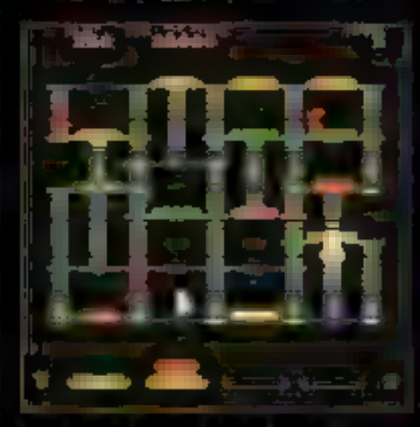
PRACTICE THE LADDER/PLATFORM TRANSITION

■ Chef Pepper isn't the nimblest of arcade heroes and he transfers from ladders to platforms rather clumsily. Practicing leaving the ladders at just the right moment can save vital seconds and space.



WATCH FOR THE CHOKE POINTS

■ While the earlier levels offer plenty of escape routes, many of the latter ones contain single ladders in and out of areas that can often see Chef Pepper trapped. And don't forget there are extra points for downing ingredients with an enemy on them.



PATIENCE, DON'T PANIC AND HAVE LOTS OF 10P PIECES

■ OK, so the last point is only relevant if its 1983 – but the others still apply. A direct route may not be possible so bide your time, wander the maze and stay calm. These burgers won't make themselves!

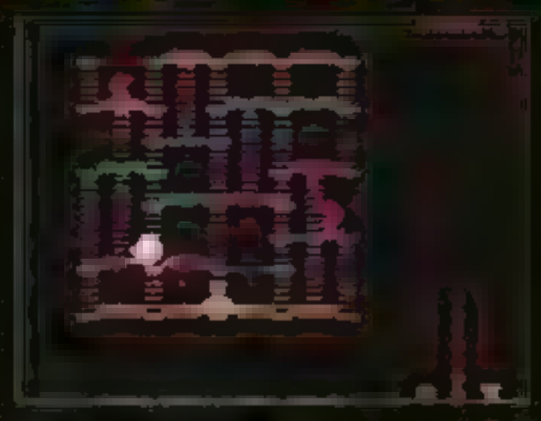
CONVERSION CAPERS

APPLE II

■ The buns may look like they've been doused in icing sugar, yet this is a credible port of *BurgerTime*. Pepper moves around the screen smoothly and the Mr. Hot Dogs have gained a creepy set of white eyes. There's also no sign of that damn tune – which is always a bonus.

ATARI 2600

■ Produced by Mattel's M Network, this version is hardly the most advanced graphically, although there's a fairly decent stab at recreating Mr. Hot Dog and the main character, Pepper himself seems to struggle a bit up the ladders. Maybe he needs to lay off the junk food...

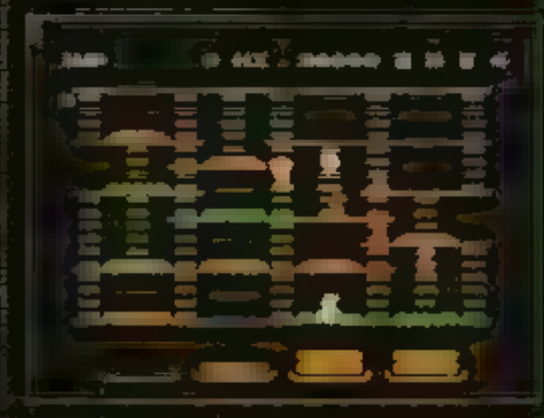


COLECOVISION

■ An incredibly faithful version of the arcade original. Everything is all present and correct from the food-based enemies to level design and (ugh) that incessant melody. Without doubt one of the best home console versions and some delicious-looking burgers!

NES

■ Another solid port that doesn't add anything new to the template (despite being released several years after the original) but does its job very efficiently. All the sound effects, graphics and gameplay are pretty much as per the original arcade game.

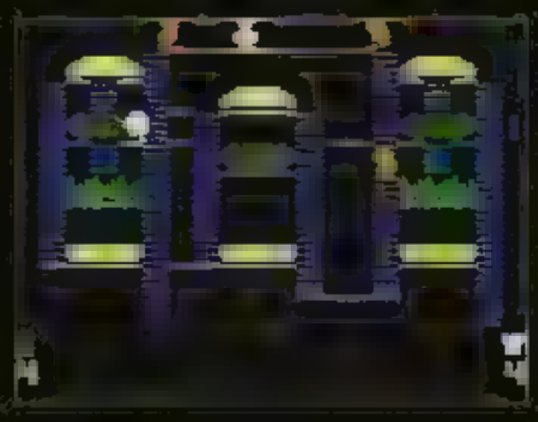


COMMODORE 64

■ Well, this is cheeky. Arcade clones were not rare, of course, but at least the majority of publishers normally changed the name. Some sources reckon this is genuine, but we reckon not, given it was published in 1984 by UK's Interceptor Micros and fails to namecheck Data East anywhere. It isn't much cop.

INTELLIVISION

■ Not only an excellent conversion of *BurgerTime* by Ray Kaestner, but also one of the bestselling games on the Mattel console. Despite a (necessary) squashed screen it retains most of the original's charm and playability. Pepper transfers between ladders with less precision, making it a slice easier when the action heats up.

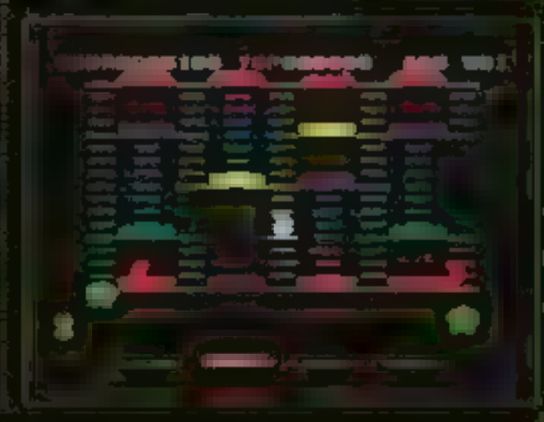


T1-99/4A

■ The Texas Instruments computer has another credible conversion of *BurgerTime* despite a number of elements from the original being absent. The graphics are smart, the sound accurate and only a few minor gameplay complaints, such as being unable to throw pepper while moving, mark against it.

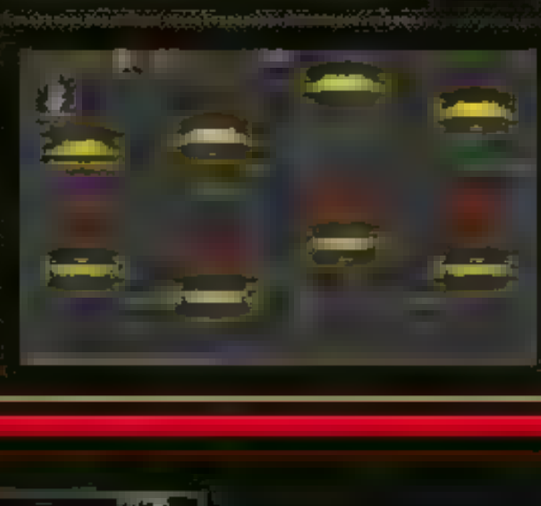
MSX

■ *BurgerTime*'s simplistic aesthetics and gameplay certainly helped when it came to home conversions and this MSX port is another decent effort. Chef Peppermint has had something of a makeover, but otherwise the sprites are excellent and the ingredients even offer a neat little bounce as they fall down.



PC-DOS

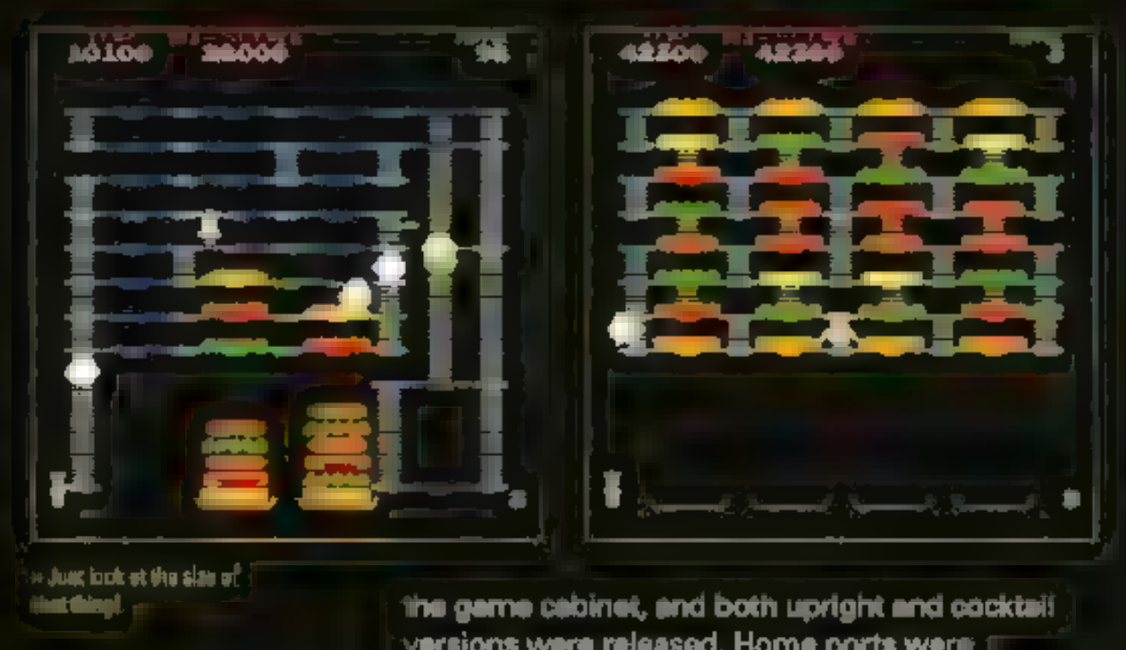
■ Opinion again seems divided on whether this is an official conversion of *BurgerTime* or not, but given it's by Mattel and mentions Data East on the title page, we reckon so. It has horrible CGA graphics, but is actually a very competent and enjoyable version, it's even slightly easier than the arcade original.



MATTEL AQUARIUS

■ This is a colourful conversion with all the burger elements adequately represented. The game does play jerkily, however, and the Mr. Hot Dogs and Mr. Pickles have been transformed into rather odd-looking stick men. The sound effects are suitably crunchy although the annoying tune is also present.

"With imitation being the sincerest form of flattery, many clones were released on home computers"



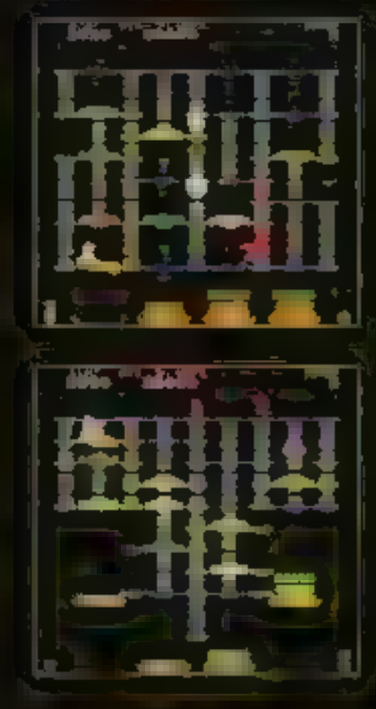
» Just look at the size of that thing!

the game cabinet, and both upright and cocktail versions were released. Home ports were inevitable, and the game saw action on a range of systems including the Mattel Intellivision, Atari 2600 and ColecoVision. And with imitation being the sincerest form of flattery, many clones such as Ocean's *Mr. Wimpy* and Blaby's *Barmy Burgers* were released on home computers. The official validity of Interceptor Micros' *Burger Time* remains in doubt, but given the lack of any other authorised conversions from the Hampshire software house, it seems an unlikely genuine licence.

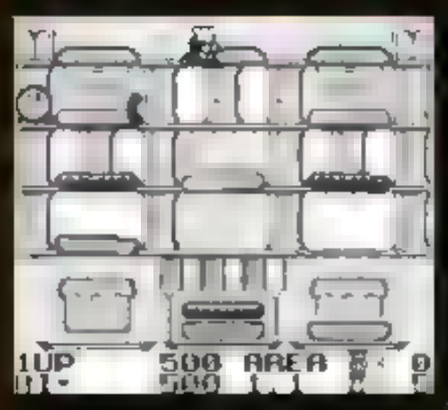
Arcade spin-offs and sequels also appeared. In 1984, Data East released *Peter Pepper's Ice Cream Factory*, in which the kitchen hero has now graduated into his own eponymous business. Instead of burgers, Pepper must kick ice cream into waiting cones, and as you might expect there is another range of food-based enemies out to hinder him. While he cannot shake pepper, Peter now has the ability to haphazardly jump around, although he clambers up ladders with all the sluggishness of his *BurgerTime* incarnation, which is a bit rubbish.

BurgerTime received an arcade update proper in 1990 with *Super BurgerTime*. Clearly influenced by smash arcade games such as *Bubble Bobble* and *Rainbow Islands*, *Super BurgerTime* was as massive a step-up in gameplay and presentation, as you might expect given the eight-year gap. Apart from its cute graphics, Peter Pepper now moves considerably nippier than his arthritic forebear and many of the levels take place over more than one screen. There is also a range of bonus weapons that can help Pepper dispatch any menacing baddies, which partially offsets the fact the ingredients must now be jumped on three times, making that process a little trickier. Most likely due to the success of the Intellivision port, *BurgerTime* also received an exclusive sequel on the Mattel console called *Diner*, which attempted to merge the format with an isometric-style viewpoint.

Today, *BurgerTime* remains a bit of an oddity. Brutally difficult, yet original and compelling, its gameplay will endear it to few modern gamers. For an oft-touted forgotten title in the history of arcade games, it's received many updates over the years, going some way to dispel that belief. Chef Peter Pepper himself has made his mark too, featuring in the movies *Wreck-It Ralph* and *Pixels*, and one thing is for sure: whether you're an Eighties veteran or current-gen newbie, it's still hot in Chef Pepper's kitchen. ★



SEQUELS



BURGERTIME DELUXE

■ Originally released on the Game Boy, and now available on 3DS (via Virtual Console), mobile and PC, this – as the name suggests – is an upgrade of the original arcade game. Except it's not, really – it's just the same game with new music and levels. The screen is predictably cramped, but Pepper moves smartly and it retains much of the original's charm.

THE FLINTSTONES: BURGERTIME IN BEDROCK

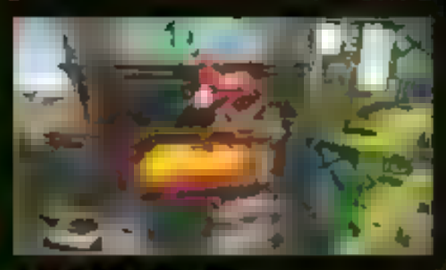
■ Another Game Boy release, this time for the Game Boy Color. Wedded to the popular Hanna-Barbera cartoon, it's an upgraded port of *BurgerTime Deluxe* with *Flintstones* sprites replacing the originals. It does, however, have some additions such as power-ups (invincibility and speed, for example) and scrolling levels.

PETER PEPPER'S ICE CREAM FACTORY

■ This (sort of) follow-up retains the one-screen format of the original but it is different mechanically. Pepper, having graduated to deserts, must now kick ice cream scoops somewhat improbably into their cones, but the main character moves too sluggishly for the game to be a genuine contender.

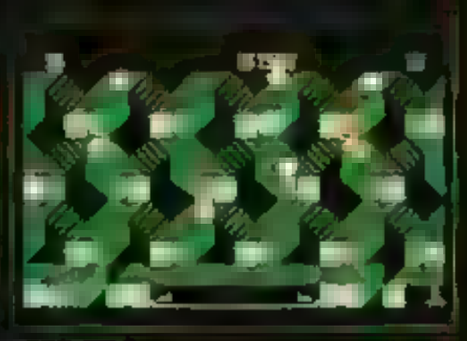
SUPER BURGERTIME

■ Released in arcades seven years after the original, *Super BurgerTime* is essentially *BurgerTime* given the *Bubble Bobble* or *Rainbow Islands* treatment, including a two-player mode. Multiple lands, power-ups and the ability to jump make it much more accessible than the original game – be warned, though, the game is still a tough cookie on later levels.



BURGERTIME WORLD TOUR

2011's revamp of the classic arcade game received mixed reviews, and it's easy to see why. The original's hook was its simplicity, and by yanking the game into 3D, much of that disappeared. Unfair deaths due to an errant camera and poor collision detection don't help making the game a very frustrating experience. This one is for hardcore *BurgerTime* fans only.

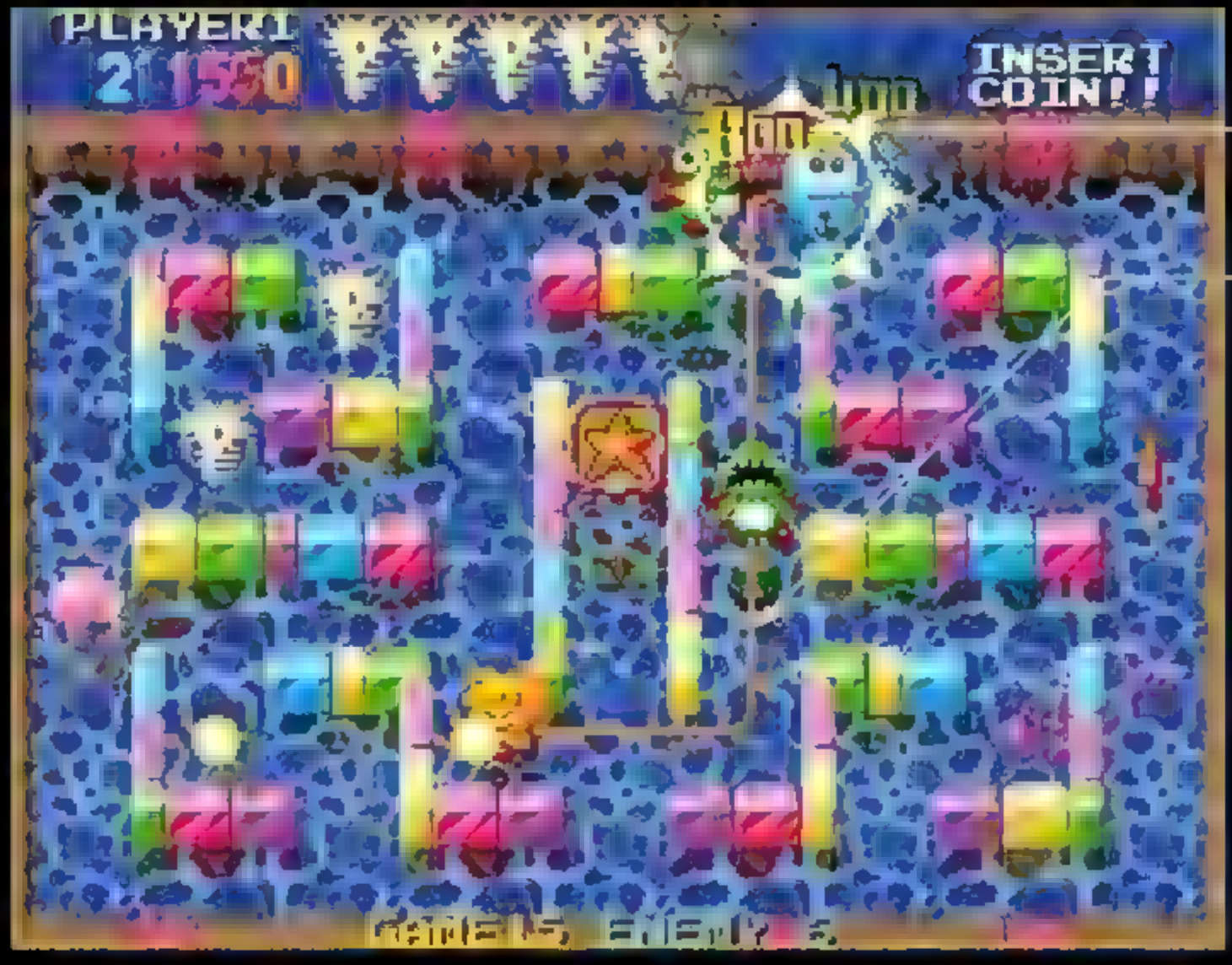


DINER

■ For the Intellivision-exclusive follow-up to *BurgerTime*, INTV took the reins and Ray Kaestner was called upon once more to code the game. This is an interesting take on the *BurgerTime* formula, but the isometric 3D effect doesn't really work with the gameplay and it just ends up being frustrating as a result. Like *World Tour*, it's for the devout *BurgerTime* fan.

THE UNCONVERTED

Arcade games that never made it home



» Hitting multiple enemies with the ball is not only an effective tactic, but a high-scoring one. Each enemy is worth twice the points of the last, making combos worth trying.

» Attacking with the trailing ball requires planning – you're responding to enemy movements rather than directly assaulting them, and enemies can still evade when the ball is moving.

» Returning characters from previous games have received a makeover for their appearance in *Tinkle Pit*, but retain their old abilities – these Pookas from *Dig Dug* can travel through walls.

» When a whole cake is collected, this slice will grow into a whole cake and a new slice will spawn. Growing your items is an important step to achieving high scores.

TINKLE PIT

■ Developer: Namco ■ Year: 1993 ■ Genre: Maze Game

If you ever need reminding that the arcade market of the early Nineties was a weird, transitional scene, *Tinkle Pit* should serve well. Despite the declining popularity of traditional maze games and the market's preference for the 3D games which were finally beginning to come of age, Namco chose to release *Tinkle Pit* into arcades in 1993. That's the same year it released *Ridge Racer*. But while it's true that *Tinkle Pit* is something of an anachronism, it plays rather well.

You play as a young blonde chap, who happens to be accompanied by an anthropomorphic sleigh bell. He's promptly plonked into a maze to fight all manner of enemies, including familiar Namco characters drawn from games such as *Toy Pop* and *Dig Dug*. The main way to defeat enemies is with the bell. Pressing a button fixes its position, allowing your hero to run around the maze while leaving a trail of string behind. When the button is released, the bell will follow the trail back to your position, knocking out any enemies it encounters along the way. You can also collect yellow energy balls which are thrown forward and bounce around the maze, but these are single-use and can only defeat one enemy at a time. Stages are cleared by eliminating every enemy. Every few stages, a boss will appear which takes multiple hits to defeat.

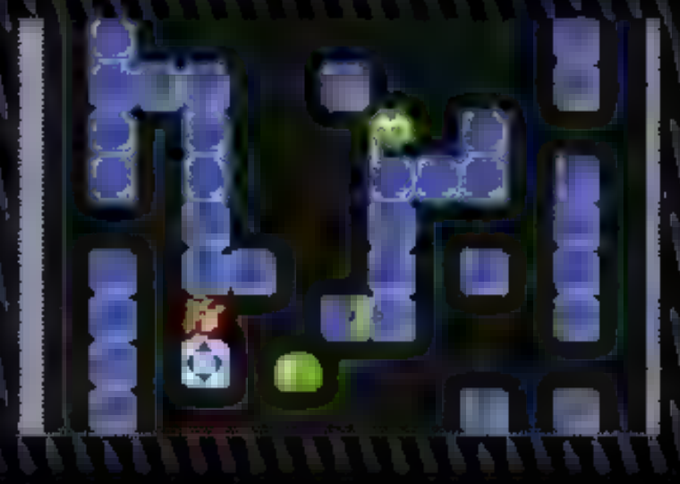
Tinkle Pit manages to keep things interesting, with good scoring mechanics largely responsible for this. Greater scores are awarded for knocking out multiple enemies with the bell, encouraging you to leave longer trails. However, long trails allow enemies more time to leave the bell's path. Additionally, each stage contains pick-ups which award more points. These come in small and large varieties, and you're encouraged to pick up large items to allow small ones to grow. Pick up all eight large items and you'll get a major bonus.

There's a lot to like about *Tinkle Pit* and Namco fans will enjoy spotting all the returning characters – there's even a power-up which turns you into *Pac-Man*. However, thanks to its Japan-only release and the general decline of maze games as a genre, it's easy to see why *Tinkle Pit* didn't receive any conversions.

CONVERTED ALTERNATIVE

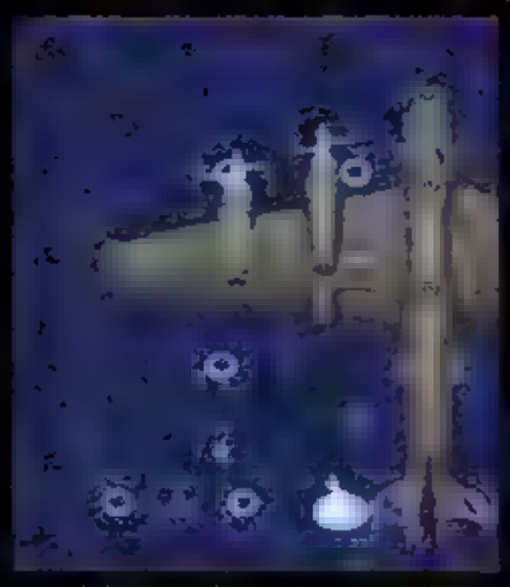
PENGO 1982

Sega's block-kicking penguin has appeared on a variety of formats since his debut, including the Atari 2600, Commodore 64 and Game Gear. However we're big fans of the 1995 Mega Drive remake which features new mechanics and a multiplayer mode, as well as an excellent conversion of the original arcade game.



ARBALESTER

■ Developer: Seta ■ Year: 1989 ■ Genre: Shoot-'em-up



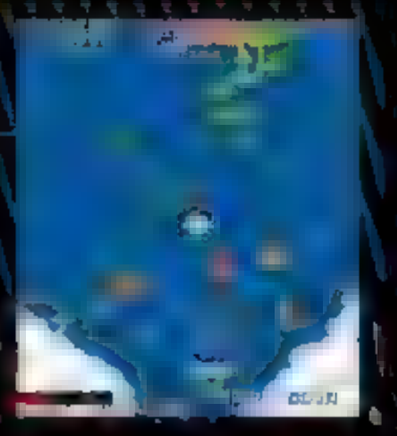
» A relatively unremarkable shoot-'em-up, but *Arbalester* includes some impressively large enemies.

■ **If you're not well versed in medieval weaponry, that title might seem a bit strange to you.** An arbalest is a crossbow variant, which is of course perfect for a game about fighter planes. *Arbalester* is a rather traditional shoot-'em-up in the same vein as the likes of 1942 – no bullet hell here. As well as shooting forward, your plane bombs ground-level targets by default, and comes equipped with an exchangeable secondary weapon that can send miniature planes or massive flying fortresses at the enemy.

Visually the game takes an age to get going, with very little variation in the sea backgrounds of the early stages, though it does pick up a little later on with the inclusion of cloudscapes and forests. Much better are the gigantic bosses on offer, but these are sadly few and far between. *Arbalester* is a largely unremarkable shooter, with little to distinguish it from the more accomplished competition that had arisen in the late Eighties. This likely put paid to its chances of a NES release back then, but paradoxically increases the appeal of the game today – it has the simplicity of a mid-Eighties shoot-'em-up but feels fresher due to a lack of familiarity.

CONVERTED ALTERNATIVE

1943: THE BATTLE OF MIDWAY 1987



Capcom's shoot-'em-up also has a realistic theme, but as the sequel to the popular *1942* it received a number of home conversions, appearing on the major home micros as well as the NES and PC Engine. Arcade-perfect versions later appeared on *Capcom Classics Collection Volume 1* for PlayStation 2 and Xbox.

CONVERTED ALTERNATIVE

NBA JAM 1993

After blowing the arcade sports genre wide open, it was inevitable that *NBA Jam* would make the trip to home consoles, and it eventually arrived on the Mega Drive, Mega-CD, Game Gear, Game Boy and SNES. It happens to be a fair bit better than *Rim Rockin' Basketball*, too.

RIM ROCKIN' BASKETBALL

■ Developer: Incredible Technologies ■ Year: 1991 ■ Genre: Sports

■ ***Rim Rockin' Basketball* is a strange release.** Struggling forth on noticeably dated hardware, the game offered a more serious take on basketball than the likes of Midway's *Arch Rivals*. The game switches perspective as the ball is turned over to the opposing team and players are limited to simple shots and passes. Certain fouls are included and the occasional graphical touch such as a shattering backboard enlivens proceedings, but overall this is not spectacular work.

The game's major saving grace is its multiplayer, as up to four players are supported by the cabinet. However, there's a major downside to this – a full game will last the best part of an hour as the game counts down its quarters in real time, but credits only last for a fraction of a quarter. As a result, playing a full game of *Rim Rockin' Basketball* is ridiculously expensive, especially when multiple players are involved. Games from Incredible Technologies never received home conversions, explaining the failure of *Rim Rockin' Basketball* to make it to consoles.

» The attacking team is always running upwards, as the viewpoint changes at each turnover.

BEST LEFT IN THE ARCADE

MIRAI NINJA

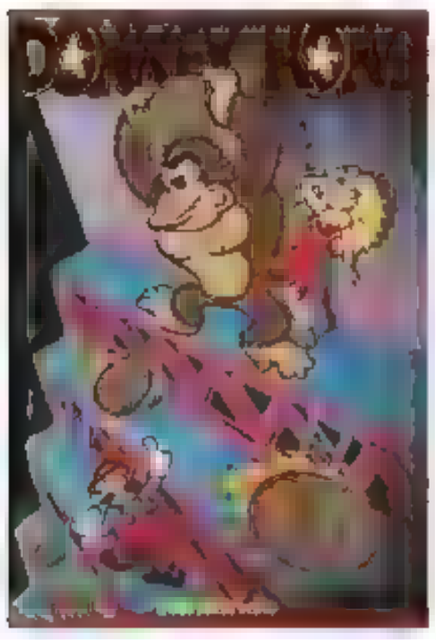
■ Developer: Namco ■ Year: 1988 ■ Genre: Run-and-gun

■ **Licensed from a film of the same name, *Mirai Ninja* is a run-and-gun game that was exclusive to Japanese arcades.** The basic premise isn't too different from games such as *The Legend Of Kage*, with a seemingly limitless supply of ninjas zapping in to provide shuriken-fodder. The game doesn't look too bad, with nice stylistic touches like a life indicator written in kanji, and it contains some rather neat sections with massive rotating sprites that admittedly look very impressive. Unfortunately, that's where the praise ends.

Stage design in *Mirai Ninja* is incredibly dull, with flat layouts that barely differentiate themselves from one another. Enemy design is similarly bland, with few foes providing any real challenge – even the bosses are pushovers. Worse yet, power-ups are limited to a screen-clearing smart bomb and a triple shot. It feels extraordinarily dated, bearing in mind that ninja games such as *Strider* and *The Revenge Of Shinobi* appeared in the same year. If licensing was the factor that prevented this from making a home appearance, we should be grateful.

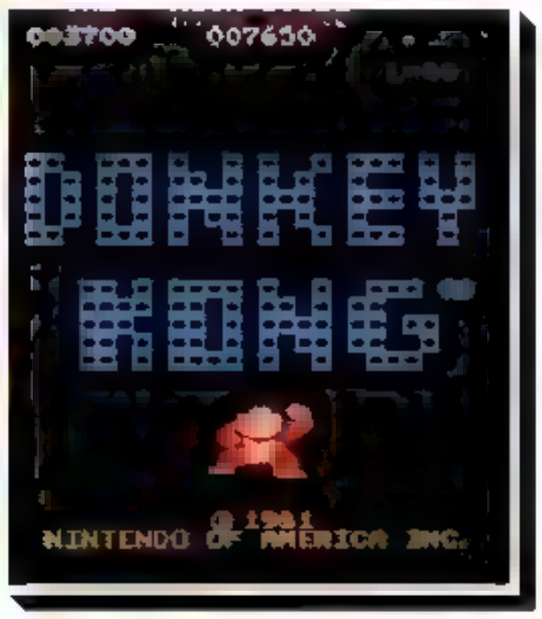
IN THE KNOW

» **Publisher:** Nintendo
» **Developer:** Nintendo
» **Released:** 1981
» **Systems:** Arcade, Various
» **Genre:** Platformer



Donkey Kong

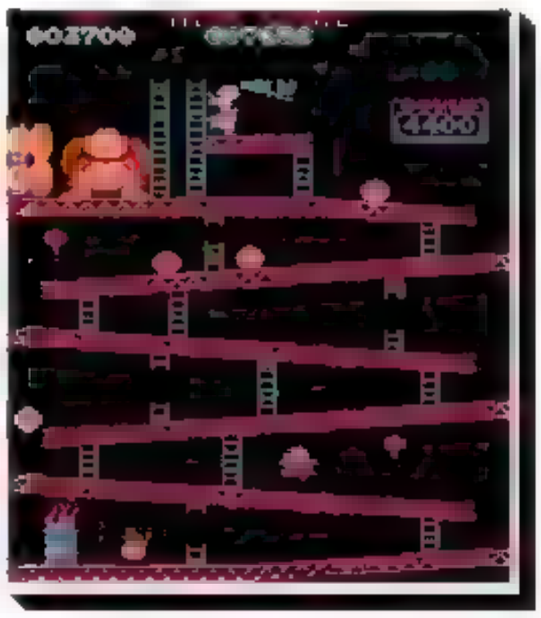
Martyn Carroll takes a definitive look back at Nintendo's timeless classic and unravels its brilliance by speaking to the very people who know the coin-op intimately



When it comes to iconic videogames, *Donkey Kong* is the daddy. Created by gaming legend Shigeru Miyamoto and released to huge success in 1981, it's one of the most celebrated and treasured games in history. It goes without saying that it has single-handedly defined the platform genre and introduced us to not one but two of the most popular videogame characters ever – the titular gorilla and his tormentor Mario. Such is its impact that some enduring videogame myths have built up around its creation. Was the game supposed to be called 'Monkey Kong' but the name got misinterpreted somewhere along the way? Probably not. Was the game originally designed as a vehicle for Popeye and Brutus? Apparently so. Was the game responsible for saving an ailing Nintendo of America from certain bankruptcy, and providing the Japanese parent with the funding and impetus to develop the Famicom and therefore change the course of gaming forever? Quite possibly.

The facts are that in July 1981 Nintendo produced *Donkey Kong* as an upgrade kit for *Radar Scope*, its *Galaxian*-inspired game released the previous year that, despite initial success, had largely flopped in the US. The majority of US-based *Radar Scope* machines were converted, clearly indicating that the space shooter hadn't been pulling in as many quarters as hoped. The new game certainly did the trick, as Nintendo quickly went from manufacturing conversion kits to building dedicated cabs to meet the massive demand. This led to two cosmetic 'flavours' of *Donkey Kong*: the now, widely produced blue-coloured cabs with added side art, and the rarer converted *Radar Scope* cabs that retained their original red paintwork.

A year on from its initial release *Donkey Kong* had reportedly earned Nintendo $180 million. This success led to a clamour of console and computer manufacturers looking to license the coin-op. Once more, the whole episode is now swamped in folklore, with deals done that supposedly led to lots of hand-wringing and toy-throwing.



It's even commonly suggested that *Donkey Kong* played a part in scuppering negotiations that would see Atari release the Famicom in the US. All that aside, the deals resulted in Coleco receiving the home console rights and Atari settling for the home computer rights.

Coleco immediately played an ace by bundling the game with its ColecoVision console, causing hardware sales to skyrocket. It also put the game out on the Intellivision and Atari 2600 consoles. Such was the popularity of the game that even the scaled-down 2600 version shifted more than 4 million units, generating a massive $100 million in sales. Atari itself released the game on its 400/800 computers and ported it to several others, including the VIC-20, C64, TI-99/4A and Apple II. Inevitably unlicensed clones with cheeky titles like *Donkey King* and *Killer Gorilla* flooded many computer platforms in the early Eighties. Nintendo, meanwhile, capitalised on the success of the original with a couple of arcade sequels and a range of Game & Watch handheld titles. Mario would, of course, go on to dominate Nintendo's character roster for the next decade, but our anthropoidal friend swung back into contention in the mid-Nineties with the release of a new *Donkey Kong* title on the Game Boy, and the first of Rare's *Donkey Kong Country* games for the SNES.

The original game may be approaching its 30th anniversary but it is most certainly far from being forgotten. In recent years it has even been thrust back into the public consciousness thanks to the high-profile battles over the *Donkey Kong* high score world record. Die-hard players Billy Mitchell and Steve Wiebe have also been involved in a long-running battle to claim the world record, with their efforts to one-up each other's achievements memorably chronicled in the 2007 documentary *The King Of Kong*. Earlier this year a brand new competitor named Hank Chien appeared and entered the fray, so now it's a three-way fight for the most coveted title in competitive videogaming. In October 2015, Robbie Lakeman claimed the coveted title with a colossal score of 1,177,200 – but it will have probably changed hands again by the time you read this! ★

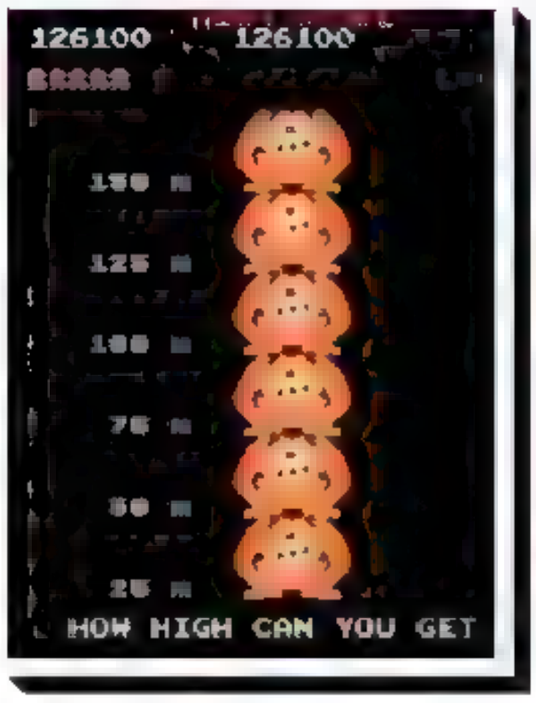
the expert

PROFILE

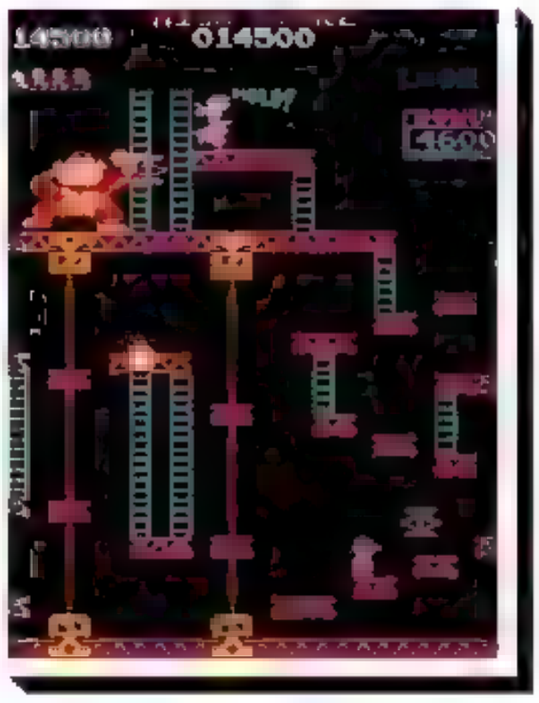
- **Name:** Hank Chien
- **Age:** 36
- **Date of birth:** 4 August 1974
- **Hometown:** New York, USA
- **Occupation:** Plastic surgeon

The battle to be 'King of Kong' was famously fought between Billy Mitchell and Steve Wiebe. That all changed in February 2010 when newcomer Hank Chien set a (now broken) new record

Is it true that you only started playing *Donkey Kong* after seeing the *King Of Kong* documentary?
I think I may have played one game of *Donkey Kong* prior to watching *The King Of Kong*, but yes, it's pretty much true. I had never played the game. After watching the documentary, I decided to play just for fun. I had no idea where I could find a *Donkey Kong* machine, but I was aware of MAME. I improved very rapidly on MAME and after three months I reached the kill screen. At that point, I decided to find a public machine and thanks to the internet I found one pretty quickly at Barcade in Brooklyn. I then searched eBay and Craigslist for my own machine and after a few months I was able to find one in reasonable shape for a reasonable price.



» Upon passing the fifth level, the game loops until level 22, where a bug prevents further play.



« Is it better to take the low or high route? Expert players always opt for the latter.

At what point did you realise that you had a chance at the crown?
My initial intention was not to break the world record. I really was just playing for fun. In fact, I was going to try to break a million and then sell my machine. I wasn't even sure I could even break a million until I actually did it. It was 13 September 2009 and I had a business trip that day and had a flight to catch in two hours. My high score at the time was around 940,000. I started to play a game in those two hours and I scored 1,037,700 and barely caught my flight. My first million point game was only 12,500 points shy of the world record. At that point, I realised I had a shot and I started playing seriously and recording my attempts.

Can you describe the events that led to you scoring 1,061,700 points on 26 February 2010?
After my first million point game, I actually did not play much because I was discouraged by the Twin Galaxies rules for scores over a million. Basically at that time it had to be done live in front of a referee. The rule was changed in November 2009, but with the holidays and work, *Donkey Kong* took a back seat. However, in early February I put my mind to it. In the coming weeks I had several very close games, so I knew I could do it. Then came 26 February, a Friday. Ordinarily I would have been at work, but a huge snowstorm covered the city and my car was buried in snow, so I was stuck at home with nothing to do but play *Donkey Kong*. In the evening I had a really good start and didn't die until late in the game. The rest is history.

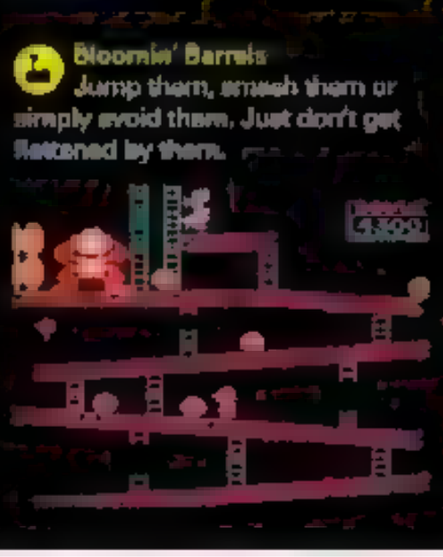
Your achievement generated lots of press once Twin Galaxies verified it. It must have been a pretty crazy few weeks for you...
After I broke the world record it was really crazy. People were calling my office, my home, my parents' home, email, Facebook, you name it. I was flooded, and that's on top of my ordinary busy life. It was fun to get all that attention, but only for about a day.

Did Billy Mitchell or Steve Wiebe offer their congratulations?
Billy Mitchell acknowledged my achievement, but I have not spoken to him directly. I would like to meet him at some point. Steve Wiebe called and emailed to congratulate me personally.

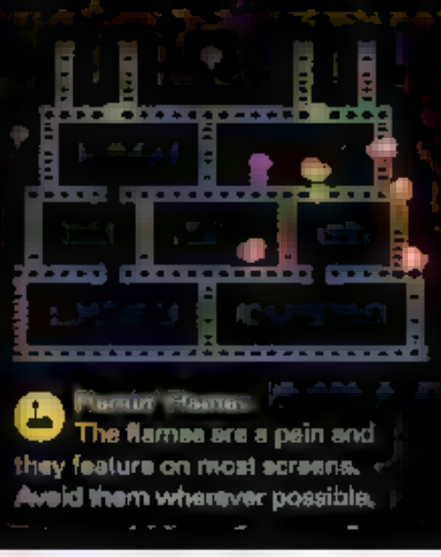
Billy reclaimed the high score in July this year, then Steve grabbed

Platforming Perils

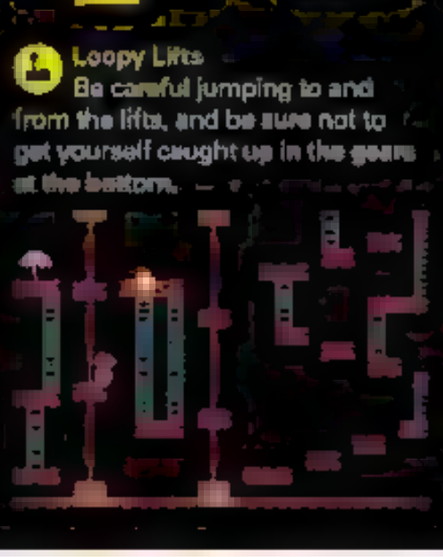
Things to look out for when attempting to topple the silly gorilla



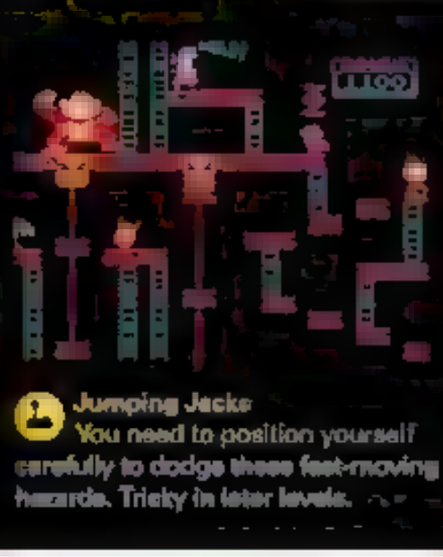
Bloomin' Barrels
Jump them, smash them or simply avoid them. Just don't get flattened by them.



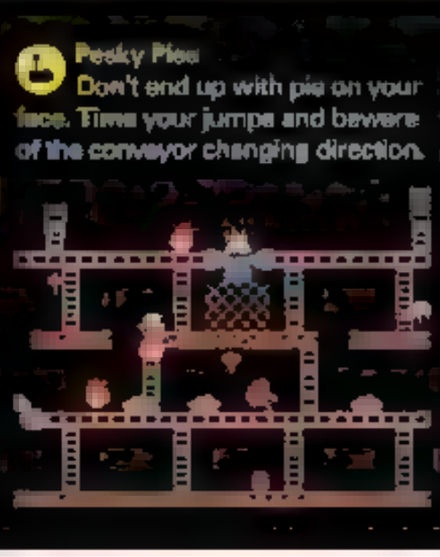
Flamin' Flames
The flames are a pain and they feature on most screens. Avoid them wherever possible.



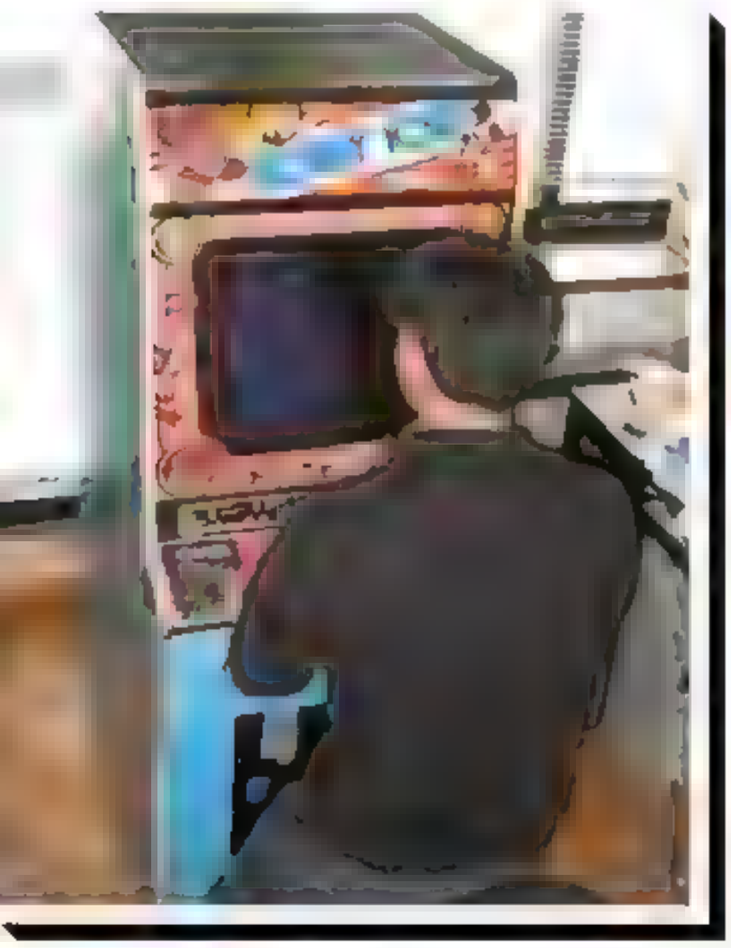
Loopy Lifts
Be careful jumping to and from the lifts, and be sure not to get yourself caught up in the gears at the bottom.



Jumping Jacks
You need to position yourself carefully to dodge these fast-moving hazards. Tricky in later levels.



Pesky Pies
Don't end up with pie on your face. Time your jumps and beware of the conveyor changing direction.



» Hank pictured here practising on his very own *Donkey Kong* cab in his Manhattan apartment.

it once again in September. It looks like neither of these guys plan to give it up any time soon. Are you planning to try to take it back?

Steve is a great player and he has been working hard to reclaim the world record, so he deserves the top spot. Congratulations to him! I do plan on taking it back, but my main goal is to maximise the game to the best of my ability, whether it is a world record or not. In my original world record game, I held back a lot and made some careless mistakes, so I know I can do a lot better. To score high you have to take a lot of risks and be really aggressive.

■ What kind of high score do you think is possible, with a perfect run?

The current world record is nowhere near the maximum. The thing about *Donkey Kong* is that there are so many variables and so many ways to play the game, it's hard to say exactly what the maximum score is. I think that the achievable maximum score is close to 1.2 million, but it would require a lot of skill and luck to pull it off. The theoretical maximum is a lot higher – maybe 1.5 million. A great thing about the game is that the world record will always be beatable. This saga isn't over yet!

■ There's been talk of *The King Of Kong* becoming a dramatised movie. If this happened and you were featured in the film, who would you like to play you?

I don't think there are any Hollywood actors good looking enough to play me, but if I had to choose, maybe Brad Pitt or Johnny Depp could do it! ★

HANK'S SURVIVAL GUIDE

Expert strategies from the newest challenger to the Donkey Kong world record

1 ■ TOP TIP

For beginners, just clear the boards as fast as you can. On the barrel stage, always keep an eye on the barrels above you and prepare for the worst case scenario. There really aren't many secrets, it's just a matter of practice.

2 ■ BONUS PLAY

When playing for a high score, it's a combination of knowing when to hang around and accumulate points and when to finish the stage to claim the bonus. It's not always beneficial to stay around for a long time, as the bonus ticks down very fast, particularly in the later levels. You have to know when you can beat the clock and when you just have to cash in early.

3 ■ HAMMER TIME

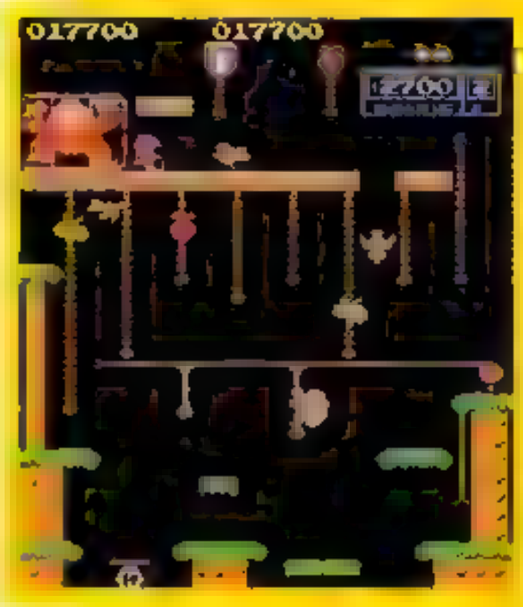
Whether to grab the hammer or not is a complicated question. On the barrel board the top hammer is safe, but the bottom hammer is dangerous to get. When I'm playing for points, but when I'm playing for survival, I usually skip it. On the conveyers and rivets, that's even more complicated. I could probably write a short book on it.

4 ■ RIVET ROUTE

There are two pathforms of the rivets that are commonly used, yet there is no consensus, even among the top players as to which is better for survival or for points. In one pattern you clear all the rivets on the left and then try to grab the top hammer. In the other, you clear all of the rivets except the one on the level with the bottom hammer, then grab the bottom hammer and run across. Over those two patterns are not foolproof and you have to know what to do when it falls apart.

the sequels

There are dozens of Donkey Kong spin-offs, but only three true sequels



Donkey Kong Jr

Released 1982

The success of *Donkey Kong* meant that the sequel arrived faster than a tossed barrel on a greased girder. But what's this? There's not a single barrel to be seen. Donkey Kong has been caged by Mario and the moustachioed one has unleashed all manner of jungle critters in an attempt to stop DK's plucky son from rescuing his dad. *Donkey Kong Jr* is a platform game, but a lot of time is spent traversing vines and chains, which can be cumbersome. It doesn't help, either, that Junior is rubbish at jumping, and the result is a slightly awkward sequel that, while utterly charming, lacks the smoothness and grace of the original.

Donkey Kong 3

Released 1983

DK Jr played a little on the sluggish side, but you certainly couldn't level that at this fast-paced shooter that's far removed from the platforming roots of the series. The title character is once again the cranky nemesis, but Mario by now had better things to do, leaving goofy urchin Stanley to step in and deal with DK. The frantic action takes place over three stages set in a greenhouse, and in each one Stanley must continually blast the pesky primate with his insect spray gun, forcing him up into the rafters where stinging bees ultimately await him. It works brilliantly as an arcade game, in that you offer up a credit and get your five minutes of fun, but the game lacks variety and doesn't warrant repeated plays, thereby denying it the lasting appeal of its forebears.

Donkey Kong (GB)

Released 1994

When it comes to resurrecting and reinventing a franchise, nobody does it better than Nintendo. This game, launched alongside the Super Game Boy in 1994, is a perfect example. It begins as a nifty homage to the original coin-op, with the arcade's four screens authentically reproduced with a few little extras thrown in, but instead of the game looping back to the beginning once DK hits the deck, it instead presents the player with a squillion extra screens to negotiate. In the majority of these, Mario must find an oversized key and carefully carry it to the locked door, which leads to the next level. Part puzzler, part-platformer, this is an excellent update that deservedly spawned its own spin-off series in the *Mario vs Donkey Kong* games on the GBA and DS.

the machine

Donkey Kong fan Chris Ellison shows off his rare red-coloured machine, which he has painstakingly restored to mint condition

Chris, a 39-year-old IT support worker from Gresham, Oregon, had hankered after his own *Donkey Kong* cab ever since first playing the game in his local bar and grill aged 11. He ran an ad on Craigslist looking for a red *DK* cab and a lady not too far away answered his call. It transpired that she'd acquired it from a local vendor who originally purchased it new as a *Radar Scope* machine. Unfortunately, it needed a lot of work. "It was one step away from a landfill," Chris tells us. "The bezel was so scratched I could barely make out the monitor. The coin door was rusted and the coin mechs were jammed up. To make matters worse, someone had attempted to cut a hole in one of the sides... I wanted a red *DK* really badly but man, this thing was a mess."

Undeterred, Chris transported the cab home and began the process of bringing it back to its brilliant best. "*Donkey Kong* was and always will be a passion for me," he says, "and it's just as much fun now as it was back then."

CABINET

To restore my *Donkey Kong*, I began by lightly sanding down the entire cabinet to give the primer something to adhere to. All of the imperfections including the busted edge and the place where someone had attempted to cut a hole were reconstructed with Bondo putty and sanded flat. The primer was shot with a spray gun. I couldn't get the oil paint to shoot correctly so it was applied using a foam roller. The paint colour was matched by removing a red chip from underneath the coin door where it hadn't seen daylight since 1981.

MONITOR

The monitor is the original Sanyo 20EZ that has been recapped – this is where all the capacitors on the monitor PCB are replaced. It is currently using the original flyback.

BOARD

The original board had developed bad RAM somewhere. Since I don't have the expertise to do this kind of a board repair, I sent it to Dick Millikan of Auburn, Washington, who is known for board repairs. Dick sent me a working board. Being a huge *Donkey Kong* fan, it was mandatory that the Brasington kit was installed. This is an add-on kit that enables the game to save high scores. It's also necessary if you want to install the *D2K: Jumpman Returns* hack. *D2K* is amazing!

CONTROL PANEL

The control panel has been replaced with a reproduction. Interestingly enough, the original panel was using the *Radar Scope* red button for jump, which I chose to re-use. The P1 and P2 buttons are the original Nintendo dark blue. The new instruction cards are also reproduction, as well as the dust cover

ARTWORK

The control panel itself is in good shape. It is not dented, warped, or Swiss-cheesed. The control panel overlay is in decent condition, though it has a hole worn in it at the front. I have a new overlay for it that I found on eBay about a year ago. I will install it when I restore the machine cosmetically. Regarding the joysticks, which are Seimitsu/SNK LS-30s, one of them was new when I got the machine, while the other has moderate wear

COIN MECH

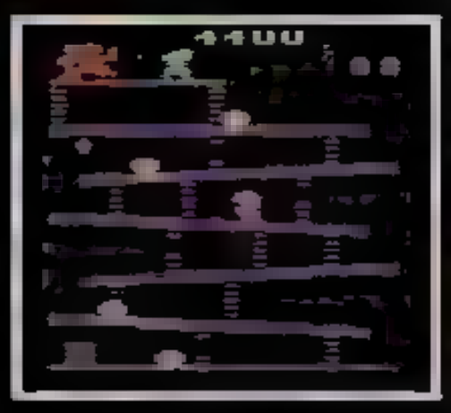
The coin mechanisms are original. I decided to paint the coin door and leave the coin entry wear marks for authenticity's sake.

developer Q&A

We speak to industry veteran Garry Kitchen to find out how he managed to squeeze Donkey Kong onto the Atari 2600

How did you get into game development?
In the mid-Seventies, while in college studying electrical engineering, I was hired by a small engineering consulting company. Among other projects, I developed and patented a handheld billiards game called *Bank Shot*, based on a 4-bit microprocessor and an array of 72 LEDs. When the Atari 2600 came out the handheld games started to suffer at the expense of the newest, greatest thing – videogames. In response, I bought an Atari machine, opened it up and reverse-engineered it so that we could compete in that space. I've been developing games ever since.

How did you land the job of converting *Donkey Kong* to the Atari 2600?
At the time, around 1981/1982, there weren't a whole lot of independent videogame developers who knew how to program the Atari 2600. I had the knowledge as I had reverse-engineered the platform the previous year. My brother Steve owned an engineering company and he had a relationship with an executive at Coleco – I believe his name was Eric Bromley. Steve got the *Donkey Kong* contract with Coleco and subcontracted the project to me. It's all about relationships.



Did you get any assistance from Nintendo?
No, nothing. My only source was the actual arcade game. I had direct access to a machine, which Coleco provided, but I didn't get to keep it!

What would you say was the most challenging aspect when working on *Donkey Kong*?
I wanted the 2600 version to look just like the arcade game, but there was a technical problem. The Atari hardware did not have enough memory to display a full bitmap background – the background memory only held enough bits to cover half the screen, so the video display driver would display either a repeating pattern or a reflecting pattern. With this limitation you could not display the slanted ramps that were such an important aspect of the look of the game. This frustrated me until I came up with a technical solution to overcome the limitation, allowing for slanted ramps. It required a rewrite of much of the code but I think it was worth it.

How long did you work on the game, and were you up against a deadline?
It was a three to four month schedule, which was about half the time that should have been allotted. The deadline was immovable, with the ROM cartridge needing to go into manufacturing in time for a holiday shipment. I worked without sleep for the final 72 hours to deliver it on time. It took me a month to physically recover from the ordeal.

The game is often criticised for only featuring two of the original's four screens. Given more time, do you think you'd have been able to squeeze in those extra screens?
There were two factors that prevented me from including the other two screens. The cartridge was 4KB in size, and the beta version of the game, after three months of labour and two screens complete, came in at around 6KB. I was over by 2KB. Bigger cartridges were available, but Coleco made the financial decision not to go for an 8KB cartridge, despite my recommendation and pleading. So, rather than having an extra 2KB to play with and add more screens, I had to spend the last month crunching out 2KB just to make the two screens fit in a 4KB cartridge. The second factor was the schedule. There was no time left. The other screens would have been impossible on the allowed schedule.

The game was a huge seller, with sales of more than 4 million units. Were you lucky enough to get a slice of the profits?
I got a very, very tiny slice. Enough to make it worthwhile, but I certainly didn't get rich off it.

Looking back, how do you reflect on the game?
Not to pat myself on the back, but I still love the game. I thought it turned out pretty well. From my perspective I focused on the quality of the game experience that was in the cartridge rather than lamenting the fact that the other levels were missing. I really wanted to get the iconic first level, with Mario jumping over barrels, to feel as close to the arcade game as possible, and I'm comfortable with how that turned out.

These days you're involved in iPhone development at AppStar Games. What's your take on the Apple devices' importance?
The importance of the iPhone cannot be overstated. The single most important thing it has done is change the buying habits of the videogame consumer. Two years ago my eight-year-old son would ask me for a $30 cartridge for his Nintendo DS. Today he asks me if it's okay to download a $0.99 iPhone game, and he's equally satisfied with the experience. Apple has taught the consumer that good games can be had for under $2 and the games industry will never be the same. The genie is out of the box and the industry will never get it back in. ★

The conversions

Naturally, one of the most popular arcade games of all time has more than its fair share of home conversions. Here is the lowdown...

01. CPC (Best Conversion)
That Stuart Campbell awarded it the prestigious accolade of best 8-bit arcade conversion of all time back in issue 76 should be a big indicator of how good this version plays. Featuring big, bright colourful visuals, faithful gameplay and all four stages, it's a nigh-on perfect conversion for Lord Sugar's unfairly mocked wonder machine, which is why we're awarding it best conversion.

02. Atari 2600
This is a poor conversion, even by Atari 2600 standards. It's missing two stages (Cement Factory and Spring). DK looks like a deranged gingerbread man, the barrels look like cookies, and the behaviour of the enemy flame sprites – they simply yo-yo from one end of the screen to the other – is easy to circumvent. The controls aren't great either.

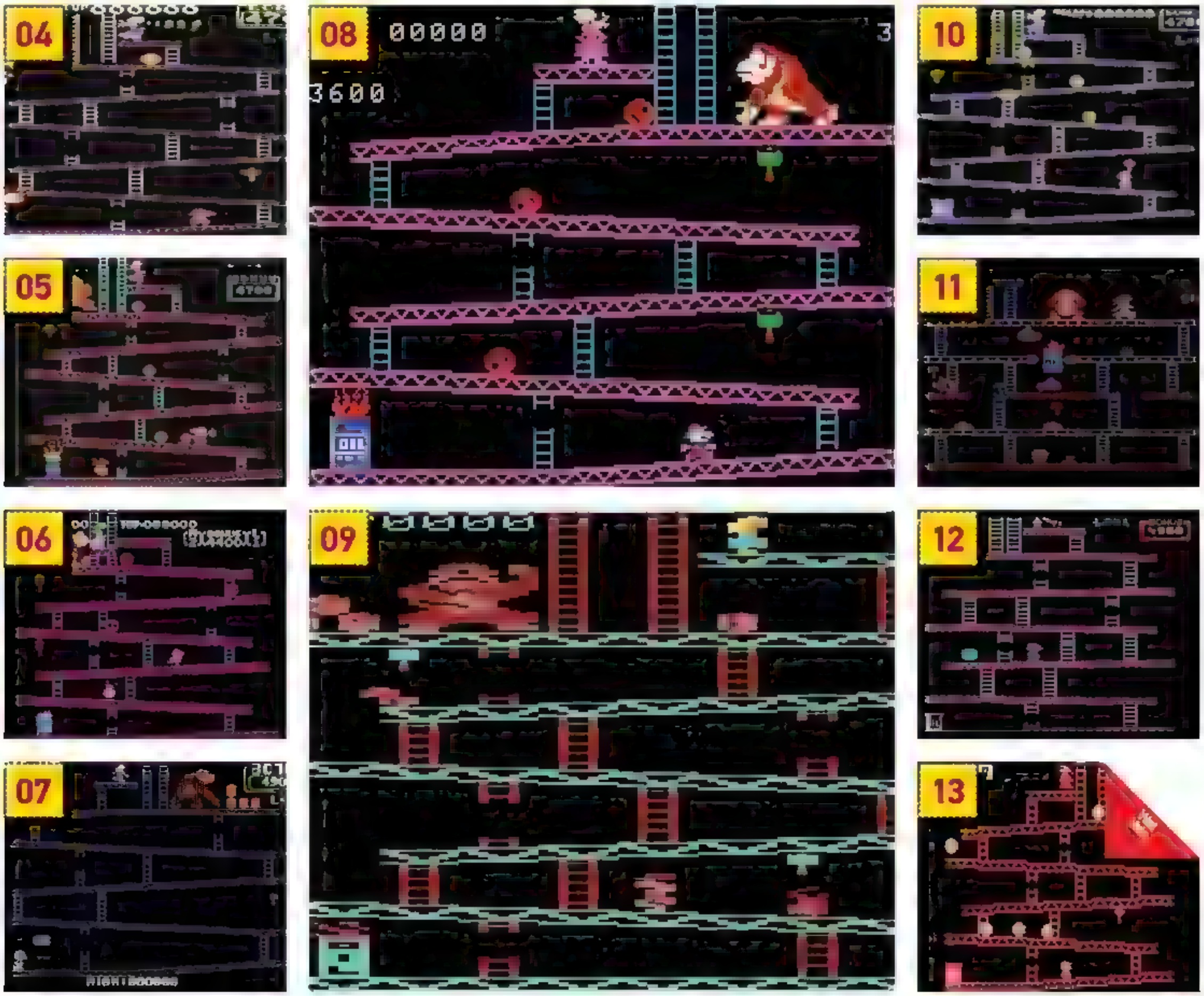
03. Spectrum
Poor graphics aside, the intensity at which Kong lobs his barrels is relentless, and coupled with Mario's woody jump is a perfect recipe for irritation. In this version it also takes Mario an unnecessarily long time to climb ladders – although this might have something to do with the giant arse that Sentient Software has retrofitted him with, only visible when he's climbing ladders.

04. C64 (Atarisoft)
This superb version by Douglas D'Dragin is another great port. Released in 1983, it's the first official port to include all the stages – impressive considering it was one of the earliest titles for the C64, and subsequent ports on machines boasting far more tech managed just three. With great presentation, and the option to tweak the difficulty of the game, this is generally the more popular of the two C64 versions that saw release.

05. C64 (Arcana)
As well as the great Atarisoft offering, C64 owners received this equally impressive one by Arcana, which also did the CPC version. Featuring all four stages – although this time it's worth noting that they follow the original Japanese level order – great sounds, smooth gameplay and all the cut scenes, it's another great conversion.

06. NES
As you would expect being on the NES, and from Nintendo, this is a great conversion. The visuals look authentic and the gameplay and controls are solid. It's missing the Cement Factory stage and the sounds and music differ from the arcade version. This is the most popular of all the home conversions, which is why the cart stayed in production for a staggering five years.

07. Apple II
Despite no Cement Factory, this conversion still offers an authentic game of *DK*, delivering some of the more trivial



elements of its arcade parent – such as the 'how high can you get' intro screen and the inclusion of Pauline's girly possessions – at the price of good graphics and sounds. It's the nippiest conversion of the game out there, and one of a handful to allow players to tweak the difficulty.

08. ColecoVision

Once again no Cement Factory stage, but nonetheless a decent effort that looks and plays well. Unfortunately its controls let it down though this has more to do with the inaccurate nature of the console's disc stick controller than anything else. Coleco also released a version for its Coleco Adam computer. It doesn't look as good as the console port, but it does include all four stages.

09. VIC-20

The graphics are below par, and the game isn't very smooth, but it's not all bad news: the game sounds fantastic and amazingly, features all four stages, which is really quite unbelievable. This is as good a job as Atarisoft could be expected to muster up on the modest tech. Taking this into account, this is another decent conversion of *DK*.

10. TI-99/4A

Biggest surprise of the night, though, goes to this fantastic conversion for the TI-99/4A. While the visuals look a little washed out, and the sound effects are painful, the sprites do look nicely detailed and the game is the complete package featuring all four levels from the arcade game in the CS order. The gameplay is nice and smooth too. A great conversion.

11. Atari 800

Without doubt the best version to be found on an Atari machine, and was another of a disproportionate number to include all four stages. There are slight differences to the arcade original that only astute *Donkey Kong* fans will pick up on, but most will see this as a good-looking and complete port that certainly puts the dismal 2600 effort to shame.

12. MSX

Unsurprisingly, the MSX conversion, which was also by Sentient Software, suffers from the same issues that plague its similar Spectrum port – namely it doesn't look great and Donkey Kong seems to be working himself into an early grave at the top of the screen. This is probably the worst of all the conversions published by Ocean.

13. Intellivision (Worst Conversion)

Mario looks like Q*bert in dungarees, Donkey Kong like Swamp Thing and Pauline like an orange dinosaur. It only features two stages and it controls like a dead body. It's rumoured that this version developed by Coleco, was so bad that upon seeing it, Mattel thought the company was trying to sabotage its machine. We can believe it.

BLACK WIDOW

Soon after joining Atari Inc, Bruce Merritt pitched a game to his peers at a luxury resort retreat. Rory Milne discovers how Bruce's pitch evolved into the vector shooter: Black Widow

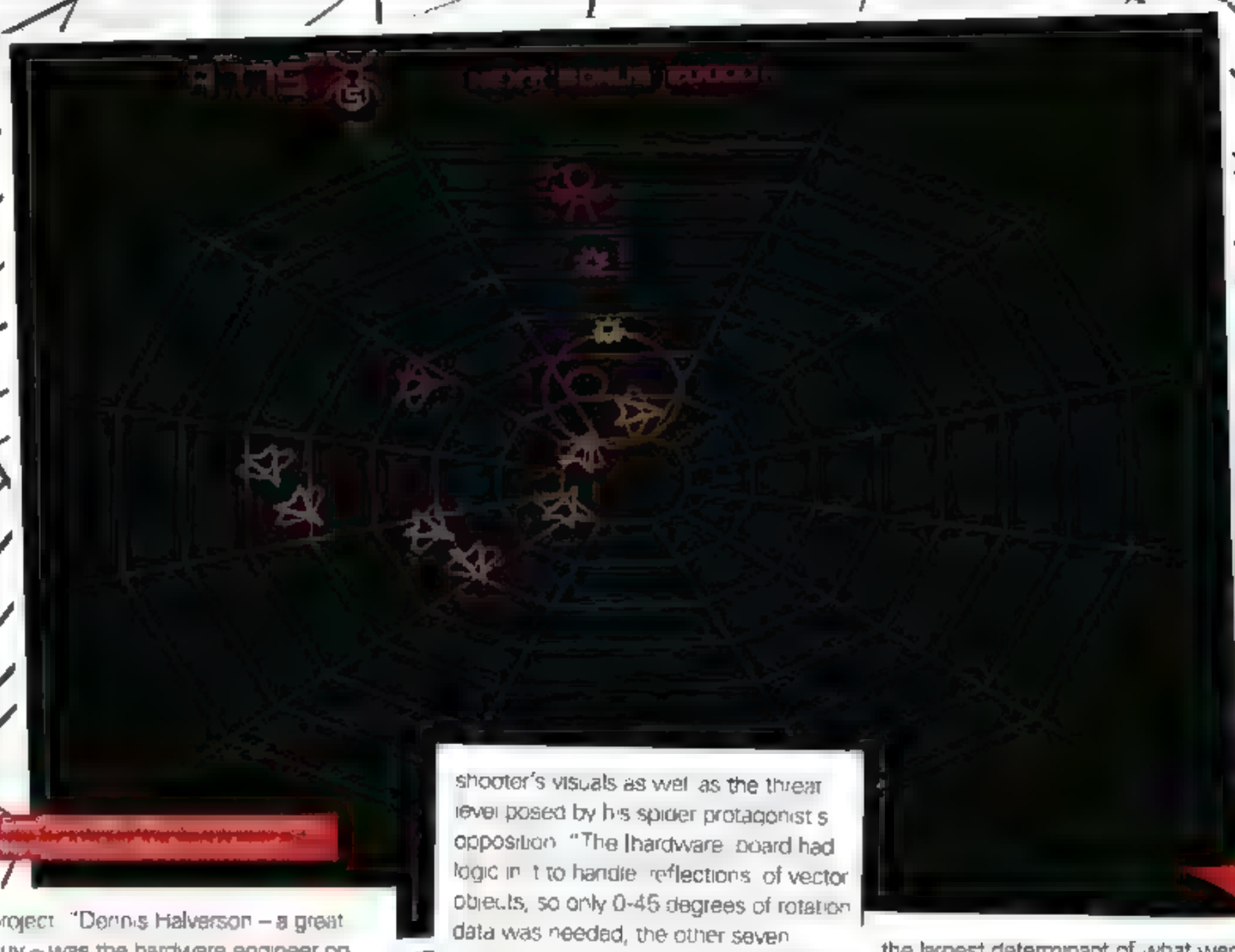
IN THE KNOW

- **PUBLISHER:** Atari Inc
- **DEVELOPER:** Atari Inc
- **RELEASED:** 1982
- **PLATFORM:** Arcade
- **GENRE:** Shoot-em-up

The Atari Inc. workforce of the Seventies had a reputation for indulging in the excesses that characterised the times while producing some of the best games of the era. Warner Communications' 1976 buyout of Atari led to new management promoting a more conventional workplace, and by 1980 even Atari's previously raucous brainstorming retreats to the resorts of the Californian coast had become more sedate affairs, as ex-Atari developer Bruce Merritt remembers. "I never attended one of the Seventies 'wild years' events – only one in 1980 – it was luxurious and everyone was pretty well behaved. [There was] no drunken and naked hot tub *Animal House*-esque behaviour that I was aware of. Of course, if things like that really had happened we all would be sworn to secrecy and would never admit it anyway."

Bruce is less coy, though, on how he resurrected an abandoned game idea by pitching it to his fellow retreat attendees. "As I recall, there was a big binder – a 'Game Morgue' – of all the wild half-baked game ideas that had been suggested but never implemented. Since I picked a game idea out of this book there was absolutely no need to defend its viability. Keep in mind that this event took place no more than a month or so after I started working there – so I was still an unknown quantity. All that I remember from it was that a spider walked on the strands of a web harvesting 'stuckees' that just happened to fly or walk onto it – the proof of concept was left as an exercise to the programmer."

Bruce's pitch proved successful and a small team was assembled post-retreat to put the proven concept into development. Dedicated hardware was produced as Bruce coded with VAX mini-computers alongside an emulator and he used a calculator and graph paper to design graphics for the



project. "Dennis Halverson – a great guy – was the hardware engineer on the project. Morgan Hoff was the project manager. We had a dedicated hardware board, which was a variation on *Tempest* hardware. The VAX had a 6502 cross-assembler and mass storage; everything else was done on a FORTH-based in-circuit emulator called Blue Box – thanks to Steve Calfee. I had a no hardware game math engine, a la *Battlezone* – so all 'rotations' were, in fact, pre-calculated sets of incremental vector coordinates. I drew all of it on some graph paper – individual bugs were drawn upright and then the 'rotations' were done using an HP calculator as I recall. The original game idea called for the spider to walk on the web-strands, an idea that was prototyped and discarded."

Controls similar to *Asteroid* were also prototyped before dual joysticks, similar to those found on other popular coin-op shooters, were employed instead, as Bruce recalls. "We had a spinner with a fire button, but, as I recall, we had a forward/reverse button pair since the spider inertia just didn't feel right, it wasn't *Asteroids*. A number of us were absolute *Robotron* junkies. The dual digital joysticks – we experimented using analogue ones first – were certainly homage to the effectiveness of those controls in moving in one direction while shooting in another. Adding that freedom allowed the game to throw more at the player while avoiding repetitive muscle injuries from frantic button pounding if you had to shoot and move in the direction that you were pointed."

This evolution of controls would affect Bruce's ongoing work on his shooter's visuals as well as the threat level posed by his spider protagonist's opposition. "The hardware board had logic in it to handle reflections of vector objects, so only 0-45 degrees of rotation data was needed, the other seven variations were done with a combination of sign changes and X/Y reversals. Dennis implemented this idea of mine using digital on-board logic. This would have given far more angles, which were needed to support an analogue set of sticks – using eight-position digital joysticks this became moot. The bad guys would have benefited from more 'rotations' but that was just too bad."

The mechanics that would govern Bruce's eclectic bad guys were also being devised as gameplay based on memory limitations and constructive criticism emerged organically. "A spider on the web, bugs that got caught, that's pretty much the skeletal gameplay," Bruce explains. "Egg laying and hatching, bulldozing, bugs-on-parade, grenade and rocket bugs – those were all conceived as we went along. 6502 EPROM memory capacity was probably the largest determinant of what went in and what didn't. Project teams were given freedom to chase things that worked, frequent drop-in playtesting by other teams' members teased out some unplanned gameplay."

The original game idea Bruce was now fleshing out had a spider harvesting insects, but in a moment of gory brilliance, Bruce realised that insects could cost his spider points by feeding on their fallen comrades, which he represented with Dollar signs. "I wanted to have the opponent bugs deal with the same issue the player was – which should be the next target? Just shooting the bugs wasn't enough, you had to go harvest the value before one of the other critters took it out. I wanted to represent something of decreasing value, the '$' metaphor worked for me. There wasn't any conscious political/financial symbolism intended."

COIN-OP CREEPY CRAWLIES

Other essential bug-themed arcade games

BOXING BUGS

DEVELOPER: Creatronic YEAR: 1981

LADY BUG

DEVELOPER: Universal YEAR: 1981

BEEZER

DEVELOPER: Tong Electronic YEARS: 1982

NOBORANKA

DEVELOPER: Data East YEAR: 1984

INSECTOR X

DEVELOPER: Taito YEAR: 1987

▶ – '$' was merely a stand-in for putrefaction and decay of bug bodies. I probably should have progressed from British pound symbol, dollar symbol and cent symbol instead of simply using colour changes."

A technical limitation of the vector display Bruce was designing for soon required he create an insect that didn't decay. In fact, the Bug Slayer couldn't be killed but could kill other insects, which added an element of risk and reward to Bruce's game. "We maxed-out the number of bugs we could render on-screen without it beginning to flicker – indicative of not refreshing often enough," Bruce remembers. "Having a limit on the number of bugs brings scenarios where you, the spider can hide on one side of an impenetrable

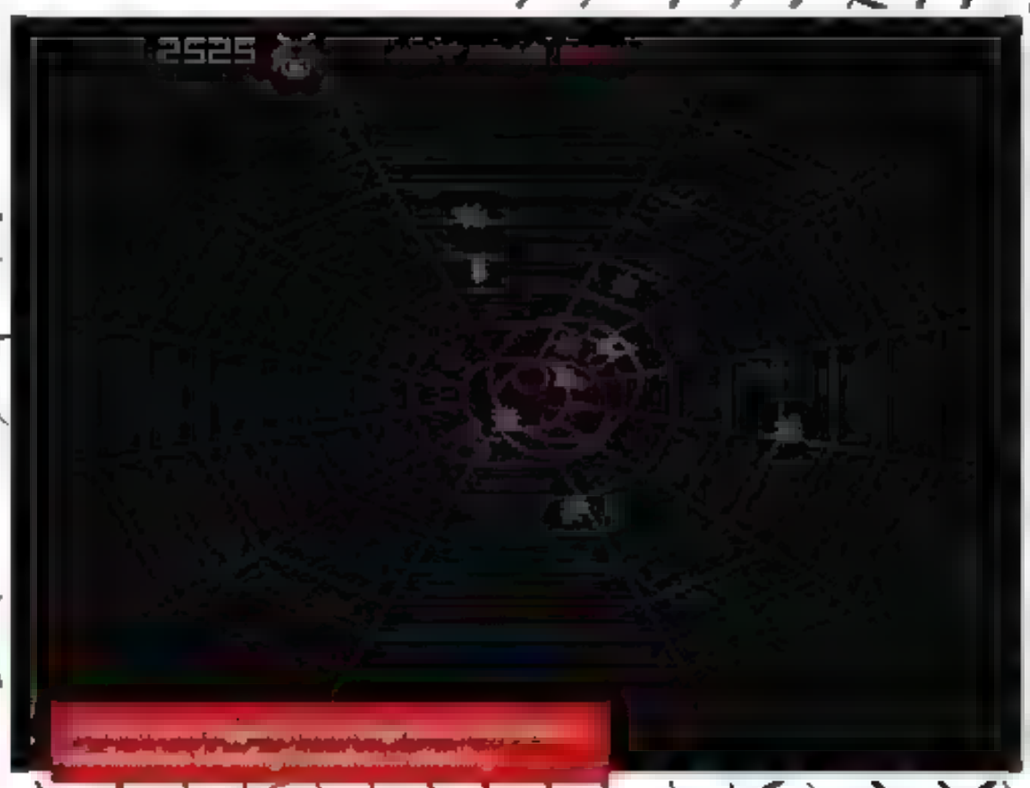
wall with bugs on the other side and do nothing. I invented the Bug Slayer for that purpose, to keep the game moving along. Making the Bug Slayer indifferent/benign toward the player was a concession to game difficulty."

Less benign, though, was the equally invulnerable Spoiler – an insect that could only be dispatched while in egg form – which Bruce created in order to destroy green web-strand shields – and the spider form. "My thought process was something like: a) the player would benefit from some sort of defensive option, b) we didn't think of any power-up shield that was appropriate, so it became a stationary webwork to hide behind, c) the defense couldn't be used against the player – the green shields are transparent to player movement, and d) the defense was somehow time-limited or vulnerable to attack. Once we had the characteristics it became a matter of finding the right trigger to remove the shields – the 'big ugly' was the answer."

In order to introduce respites into his game's now intense gameplay, Bruce made every fourth wave a bonus level. These featured insects that resembled *Asteroids* ships that flew in *Galaxian*-style formations. "I actually think it was *Galaxian* that had the aerobatic attack critters, and since bug wings/legs were interchangeable the body shape was very economical [at] three vectors," he remembers. "It was fun to add that intermission to the bloodletting, awarding bonus for killing all or none – [i.e.] dodging the parade entirely. There are a couple of times during the choreography in which the lead bug notices your position and performs course correction to head for you so you can't stand and watch."

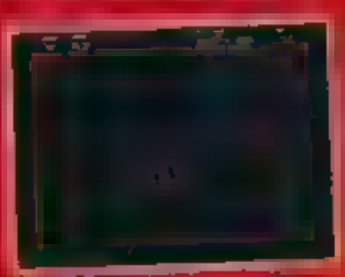
In order to cleverly sidestep an unwritten Atari policy that was in place at the time, Bruce incorporated his team's first names into *Black Widow*'s high score table, something he's pleased about. "I thought I was being so cool in positioning our first names vertically like that, we were pretty-much forbidden – or so I was told – from putting anything in that would identify the designer because of management's fear that staff would be purloined by competitors."

Although at this advanced stage, Bruce's game still had several stages of playtesting to be put through, which resulted in a few tweaks. "There were focus groups where teams hid behind two-way mirrors and watched as people played the game cold," Bruce recalls. "The real 'decider' was the field test in a local arcade. Resulting stats – total games, average game time, dollar earnings –



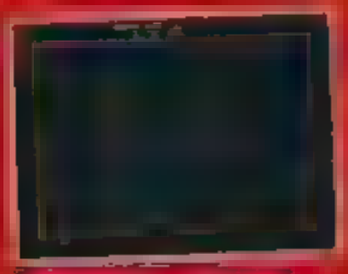
THE XY FACTOR

More curiosities from Atari's vector age



LUNAR LANDER

RED BARON



SPACE DUEL

QUANTUM

MAJOR HAVOC

DEVELOPER HIGHLIGHTS

ASTEROIDS
SYSTEM: Arcade
YEAR: 1979

TEMPEST (PICTURED)
SYSTEM: Arcade
YEAR: 1981

STAR WARS
SYSTEM: Arcade
YEAR: 1983

"Working three days on Dig Dug paid me a greater financial reward than working on Black Widow for 18 months"
Bruce Merritt

seemed to trump everything. Changes made were mostly regarding ramping of difficulty and perhaps some DIP switch settings for the projectile size."

Given its unforgiving nature, it's unsurprising that this playtesting didn't tip Bruce off that his game would lock up on Wave 104. "We had expected to have killed-off the player long before that point. I suppose in retrospect we could have just loaded the deck with nothing but grenade bugs and rocket bugs since wrapping around too easily was out of the question," he admits.

But soon after cabinet and marquee art emblazed with the title '*Black Widow*' was produced, Bruce was asked to re-port his game to an alternative hardware setup. "*Black Widow* was essentially 'done' and ready to go into production. It was its own product, had its own motherboard, cabinet and artwork. In the final weeks we were compelled to re-port the game to Gravitar hardware since there was an overabundance of Gravitar systems clogging some warehouse. The retrofit kit idea was mandated: decals, replacement control panel, replacement bezel, replacement EPROMS – all [the] things to convert a Gravitar to *Black Widow*. The Gravitar retargeting was one of timing, that game just wasn't selling. Rusty Dawe [had] put together a software music box into which we coded Prokofiev's *Hall Of The Mountain King* – something I really wanted as background music. Alas there wasn't room in the production [of the] Gravitar release so it was dropped. The finer rotation images were [also] lost when doing the port. I don't recall if there ever were actual *Black Widow* games – not Gravitar conversions. There must have been, but they wouldn't have had original *Black Widow* logic boards."

On the game's arrival in arcades Bruce expresses pride and takes a balanced view of the financial and creative rewards that he reaped from his game. "I was exhausted and very proud of it – all the rework we did to prune the features a Gravitar board couldn't support was regrettable and [it] wasn't especially creative or rewarding. I don't know how many units we were quoted as having sold but I do recall that working for three days on *Dig Dug* paid me a greater financial reward than working on *Black Widow* for 18 months. This [was] an indicator of where the flavour of games was shifting at that time. Everyone hoped their game would sell a bazillion units, but the competition was more for dazzling with your creativity and ingenuity – we were being paid to do something that we loved, all the rest was frosting."

Asked for his retrospective thoughts on *Black Widow*, Bruce offers a philosophical appraisal of his classic vector shooter. "Having only written this one game I was never in the leagues of my co-workers who had repeated money-making hits. [It's] not a bad game for a single 6502 microprocessor and a mere handful of memory. I think that's a lot of action for so little hardware. I'm delighted that it's still being played," Bruce concludes. ✱

Many thanks to Bruce Merritt for sharing his memories. Cabinet photos courtesy of Bill Johnston at ChompingQuarters.com

FROM THE

ARCHIVES

RETRO GAMER DIGS UP THE FILES OF THE CLASSIC COMPANIES OF OLD

Atari Inc

Formed by two engineers, Atari rose to define the early games industry. However, its rapid expansion hid the looming threat of bankruptcy that defined its early days, right through to the corporate overindulgence and personality clashes that oversaw its ultimate downfall

Atari's origins go back to Ampex and a little-remembered division called Videofile. A document storage and retrieval system that used videotape and television displays to search for and reproduce documents, it was capable of recalling a full page out of the phone book and printing it accurately. An analogue engineer who goes by the name of Ted Dabney had been working in the 'Input/Output' group at Videofile, responsible for the cameras and printers used to record and later print out documents, when he found himself with a new office mate. Just out of college, the young Nolan Bushnell had moved out to California from Utah after getting an entry-level job at Ampex.

Skill and personality-wise the two couldn't have been more different. According to their boss, Ed DeBenedetti: "Nolan was the dreamer and Ted was the plodder. Ted's engineering work and ideas were conservative perhaps in the extreme. Nolan and later interns A. [Alcorn] and Steve [Bristow], were brilliant, inexperienced enough that they had no idea of what one could not do."

In a sense, Ted's experienced approach to engineering would serve well to give Nolan's inexperience and forward-looking manner a solid foundation as the two embarked on a side project together. Already enjoying daily games of Go in the office on Ted's custom-built board, Nolan talked about wanting to pursue bringing computer games to the arcade environment. Tapping the more experienced Ted, he began partnering with him on trying to make the dream a reality. According to Ted: "He took me off to Stanford to see *Spacewar!* so I could help him come up with ways to do such a thing."

The original plan was to bring the experience direct to the arcade via a PDP or comparable minicomputer, and a third partner with programming experience, Larry Bryan, was brought in to that end. It turned out to be a short partnership, however, when this approach was quickly found to be cost prohibitive, but they did get a name for their engineering group out of it – Syzygy Engineering. If this plan for an electronic arcade game worked out, the two planned to have Syzygy be a contract-engineering firm for the arcade industry.

When it was decided to move to a non-general purpose format – or 'state machine' where the game is comprised of zero code but rather hardwired through chip logic – it became Ted's turn to do the heavy lifting. He designed all the circuitry to put a spot on a modified television screen and move it around, and Nolan shopped it around for someone who may be interested in funding the development of a final product, as well as manufacturing and distribution. Finding closed doors everywhere he looked, and little interest in the arcade industry mecca of Chicago, he finally found a coin-op company locally that was interested. Nutting Associates had previous successes with electro-mechanical games such as

INSTANT EXPERT

Atari Inc was founded on 28 June 1972 but technically began in 1969 as a partnership between Nolan Bushnell and Ted Dabney called Syzygy Engineering.

Atari's first arcade game was *Pong* in 1972. Its console version predated it as a home version of *Pong* for Sears in 1975.

The Video Computer System (VCS), later known as the Atari 2600, began its development in August 1975 and was released on 14 October 1977.

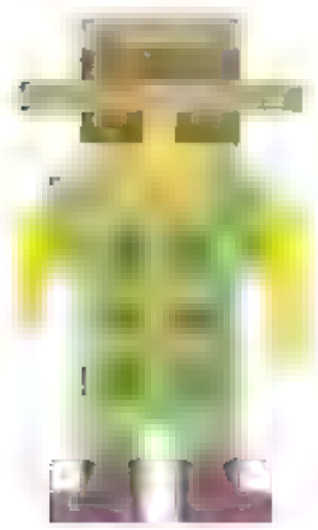
Warner Communications bought Atari in 1976 for an estimated $32 million. It gave away half of it in 1984 for no money – just promissory stock.

Atari's top game properties are *Pong*, *Breakout*, *Asteroids*, *Centipede*, *Battlezone*, *Missile Command* and *Tempest*.

Atari affected the popular culture of the early Eighties to such a degree that it became synonymous with high technology. It even affected US politics as the term 'Atari Democrat' was created to describe Democrats who supported the drive to speed up high-technology industries to stimulate the US economy of the time.

“He definitely had no ideas about TV games of any sort”

TED DABNEY ON NOLAN'S VISION WHEN THEY STARTED WORKING TOGETHER



Computer Quiz and saw the potential of this new format. Hiring Nolan as lead engineer to finish adapting Ted's work into a game while performing other duties at the company, Nutting became the future of the industry for a short time.

Having talked Ted into leaving Ampex and joining him at Nutting, by the end of development Nolan was itching to have more input on the business side of things. The two left Nutting by the spring of 1972 and decided to make Syzygy Engineering their main source of income. Funding the startup with money from Nutting's purchase of *Computer Space*, and subsidising daily operations with a coin route, Nolan looked to get their first contract. Their first client was Bally, which contracted them to produce pinball playfields and, more importantly, an electronic driving game. Nolan hired former Ampex intern Al Alcorn to work on the proposed game, and allowed him to get acclimated to their video circuitry from *Computer Space*. Nolan had seen a demonstration of the first videogame console, the Magnavox Odyssey, that past May, and decided to have Al do an arcade version of its tennis game. By the time Al was done in August of 1972, Nolan was outvoted two to one to make Al's warm-up game, *Pong*, Syzygy's actual game for Bally.

It was during this time that Atari got its now-legendary name. When looking to formally incorporate Syzygy Engineering, it was found that several other companies were already using the name. Giving the clerk a list of names based on moves from Go, the clerk picked Atari, not knowing that he would be choosing the name of the company that would define electronic entertainment for years to come. On 27 June 1972, Atari Inc was officially born. Nolan and Ted decided to keep the Syzygy name for the engineering portion of their venture, and use Atari for their outward-facing business activities.

A surprise hit

After putting several test cabinets of *Pong* out into the wild – most notably one at Andy Capp's Tavern that sat right next to a *Computer Space* unit – a funny thing happened. *Pong* was a big success, drawing in far more money than the *Computer Space* machines were, to the extent that the Atari staff were afraid that when they reported back to Bally on how the test run was doing, Bally wouldn't believe them. Wary of this, they under-reported the earnings numbers, and Bally still thought they were exaggerating.

With Bally stalling on accepting the game and looking to possibly pass it off to its subsidiary, Midway Manufacturing, and Atari knowing how well the game was actually doing, Nolan, Ted and Al had a decision to make: either let *Pong* sit in limbo to maybe be rejected altogether, or look to go into manufacturing for themselves. They chose the latter, and Ted concocted a plan that ▶

BY THE NUMBERS

$40 million The amount of profit generated by Atari as its golden age began in 1977, the year it released the hugely successful Atari 2600.

$539 million The amount it lost in 1983, as the industry's crash was under way.

2 The number of competitors Atari had in video arcade games in 1972.

25 The number of competitors by 1974.

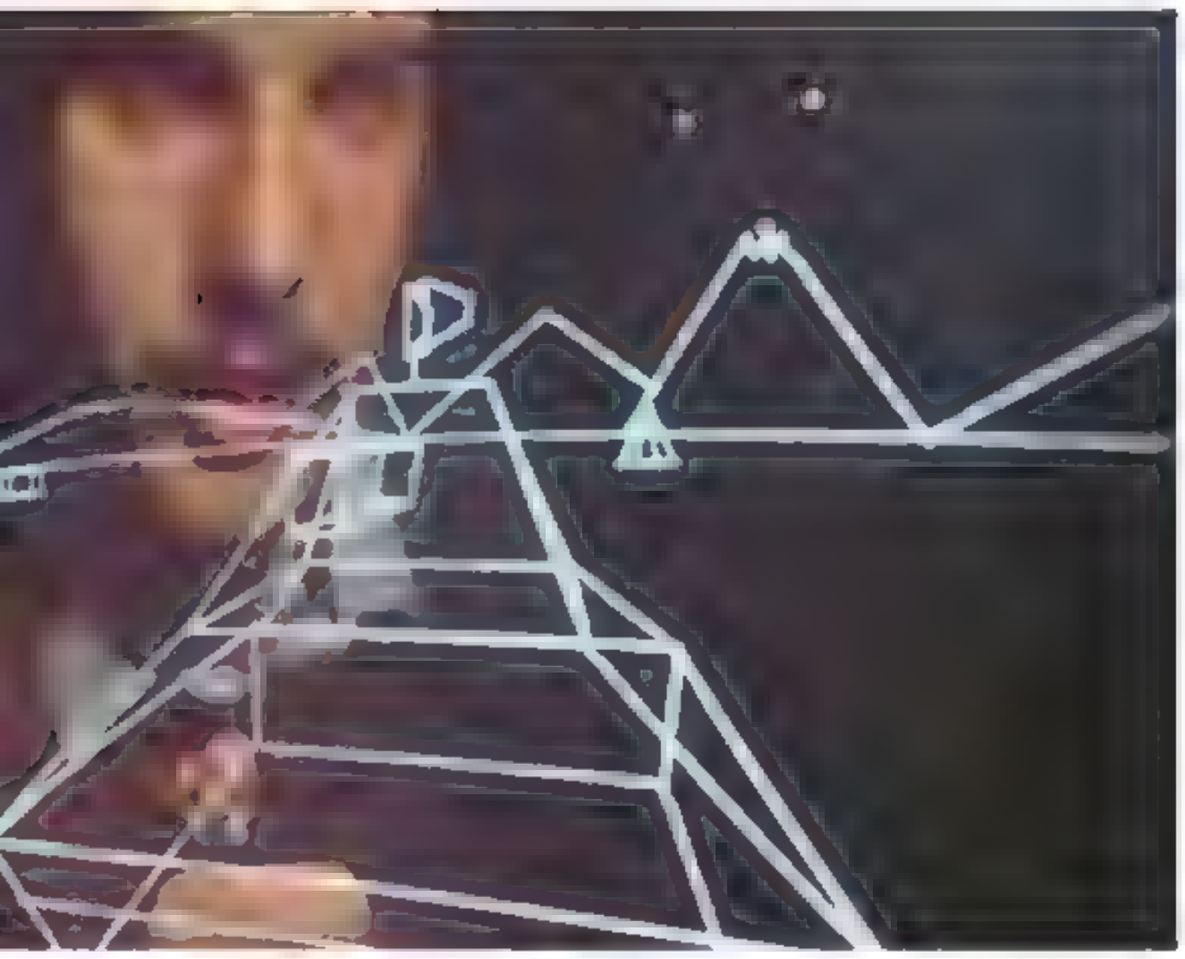
$98.95 The cost of Atari's first home console, *Pong*, in 1975.

$189 The cost of the Atari 2600 at launch.

1 The number of manufacturers making games for the Atari 2600 at its 1977 release. Of course, it was just Atari itself, although third parties would quickly appear.

145 The number of manufacturers making games for the 2600 worldwide at the time of the crash.

5,000 The number of shares allegedly sold by Ray Kassar based on insider knowledge of Atari's performance.



Nolan send a carefully crafted letter to Bally suggesting that it officially reject *Pong* so that Atari could develop a new game for it The letter worked, and Atari became a full design and manufacturing arcade company

New horizons

From there the growth was explosive, with Nolan and Ted hiring people off the streets to fill the manufacturing needs, and Nolan hiring more engineers and management to help with the growth. Tension began to develop between Nolan and Ted on how the company should be running, however and Nolan decided that there wasn't room for two heads – a fact that became obvious to Ted when Nolan hired someone to come in and help restructure the business and employee roles. When they asked Ted what he did at Atari, he knew his time was up, he was forced out of the company, with management firmly in Nolan's hands, as Atari began its 'Innovative Leisure' period.

By continuing to pump out new games based on sports themes while doing engineering research for an eventual move into the consumer market, Nolan looked to stay ahead of the game. As Al Alcorn relates: "Nolan didn't want to define us as the best coin-op game designer and manufacturer; instead he focused broadly on the entertainment business. We were creating new, disruptive products in the leisure industry. Nolan figured people would spend more money on what they want, not what they need." But things soon took their toll on the fledgling company

Nolan had made some bad hiring decisions for the financial management portion of the company, and it soon needed to lay off employees. To make matters worse, it started facing intense competition from others entering the videogame market, including old industry hands like Bally and Chicago Coin, and new companies like Allied Leisure. Already competing for a spot at the well-established coin-op distribution table, Nolan came up with the idea to create a 'competitor' to increase the cash flow of the company. It would have its own building, exhibit on its own at the industry shows, and have its own purchasing sales and engineering group, which would include another former Ampex intern, Steve Bristow, but all its manufacturing would be done on the Atari assembly line. This company, Kee Games, could clone Atari titles, allowing the company to sell them exclusively' to two distributors at once

The wheels come off

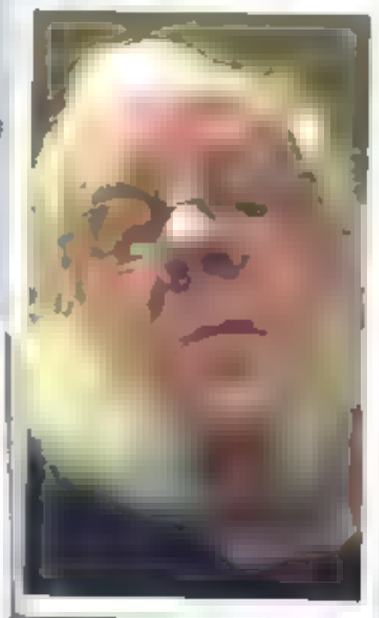
Financial disaster struck in the form of *Gran Trak 10*. The game was so badly engineered that they started coming back to Atari in droves, forcing Al Alcorn to come out of his sabbatical and redesign them, and forcing an even more lengthy delay to this already costly game. Then on top of that, an accounting error set the selling price of each unit to $995 when it cost $1 095 to manufacture it in the first place. It resulted in pushing Atari even further towards bankruptcy, and the company ended up losing half a million dollars between 1973 and 1974. By the end of 1974, Atari began to fully merge Kee into its parent and offloaded its Japanese operation to Nakamura Manufacturing Co, better known as Namco

Things started looking a bit better in 1975 as Kee's management entrenched itself at Atari. Kee president and Nolan's next door neighbour Joe Keenan became president of Atari; Gill Williams became VP of manufacturing, helping to smooth out issues there, and Kee's lead engineer Steve Bristow, became VP of engineering. Along with Steve came top engineering talent and future stars like Lyle Rains who, together with Steve, had created the blockbuster *Tank* at Kee. Several arcade classics would be released in 1975 that would go on to become more known for their Atari 2600 versions but served the ultimate goal of helping Atari get back on track. *Anti-Aircraft*, *Jet Fighter*, and the multiplayer *Indy 800*. The biggest development, though, was the fulfilment

WHERE ARE THEY NOW?

Ted Dabney
After leaving Atari Inc in 1973, Ted worked for arcade company Meadows for a time as well as several other non-arcade engineering jobs. He even briefly worked for his ex-partner again when he created the pizza number callout system for the early Chuck E Cheese, as well as the Chuck E Cheese-branded *Isaac Asimov Presents Super Quiz* arcade game in the late Seventies. He's currently enjoying retirement while reacting to the recent interest in his involvement in early videogame history with surprise, wonder and gracious interviews.

Nolan Bushnell
After leaving Atari, Nolan headed his Chuck E Cheese Pizza Time Theatre until facing bankruptcy. Funding several start-ups under Catalyst Technologies in the Eighties and briefly returning to video arcade games under Sente, he ran a string of entertainment companies including PlayNet and uWink, which eventually closed due to poor market performance. He is currently partnered in Anti-Aging Games and is an advisor to the current owner of the Atari brand, Atari SA (formerly Infogrames)



Al Alcorn
After leaving Atari Inc in 1983, he became an Apple Fellow in 1986 before moving through a string of engineering management positions at various entertainment companies in the Nineties and early 2000s. He's currently VP of engineering at uGetIt, a mobile social gaming firm that combines gaming with 'social shopping'. Former Atari employee Roger Hector also joins him there

Steve Bristow
Since leaving Atari in 1984 after more than a decade, Steve has worked as an engineer at various communications firms. Sadly, the Atari pioneer passed away in early 2015

of Nolan's wish for Atari to enter the consumer arena

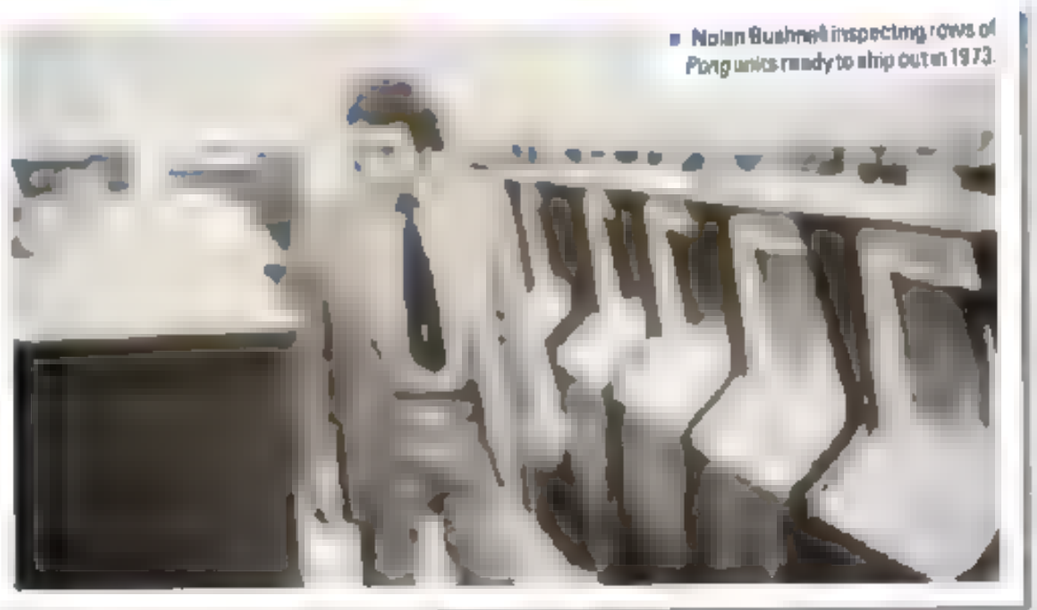
Homecoming

Al Alcorn and several engineers had been working on bringing *Pong* to homes. The move to the consumer market meant shrinking the large logic-based arcade board to a small integrated circuit, for which a partnership with chip manufacturer Synertek and its IC designer Jay Miner was formed. The end result was a product that put Atari on the map in the consumer market when it released through Sears in time for Christmas 1975. The research and development firm Cyan was also busy during *Pong*'s home release, working on a microprocessor-based home console that had the potential to more than make up for the *Gran Trak 10* fiasco.

Still realising that it wasn't enough to completely save the company and expand operations like he wanted to, Nolan began looking for more investors in Atari, and eventually, an actual buyer. As 1976 began, the buyer appeared in the form of Warner Communications. Warner had been on a buying spree to expand its operations, and the acquisition of an expanding videogame firm like Atari fit nicely into its plans. The deal was signed in October 1976, officially making Atari a Warner subsidiary.

Under Warner, development of Atari's consumer line began to blossom, the most prolific aspect of which was Cyan's microprocessor-based game console. First codenamed Stella and then officially named the Video Computer System (CX-2600), it was released in 1977 and proved to be the path to true greatness for the company when it became an icon of the videogame industry in the early Eighties. It sold well that first season in 1977 but proved financially harmful to Atari, the following year when manufacturing delays caused a shortage of the console for the 1978 Christmas season. As in the arcade industry years before, Atari was soon joined by competitors eating up the new console market – Bally with its Professional Arcade, Magnavox and Philips with the Odyssey², RCA with the Studio II, and programmable console pioneer Fairchild with its Channel F a year before Atari's console. Atari needed to separate the VCS from the pack.

Also contributing to Atari's familiar financial problems for 1978 were a lacklustre arcade line-up, such as *Sky Raider*, *Ultra Tank* and *Smokey Joe*. To make matters worse, there was tension between Nolan and Warner Communications. Nolan had been accused of being a lax CEO since the purchase, almost "checking out" of the much-needed daily running of the company, and by his own admission that was the case. Consequently, it left more room for Warner and its installed executives to flex their muscles, such as Raymond Kassar.



■ Nolan Bushnell inspecting rows of *Pong* units ready to ship out in 1973.

"It was just business, nothing personal"

NOLAN BUSHNELL ON FORCING OUT ATARI CO-FOUNDER TED DABNEY

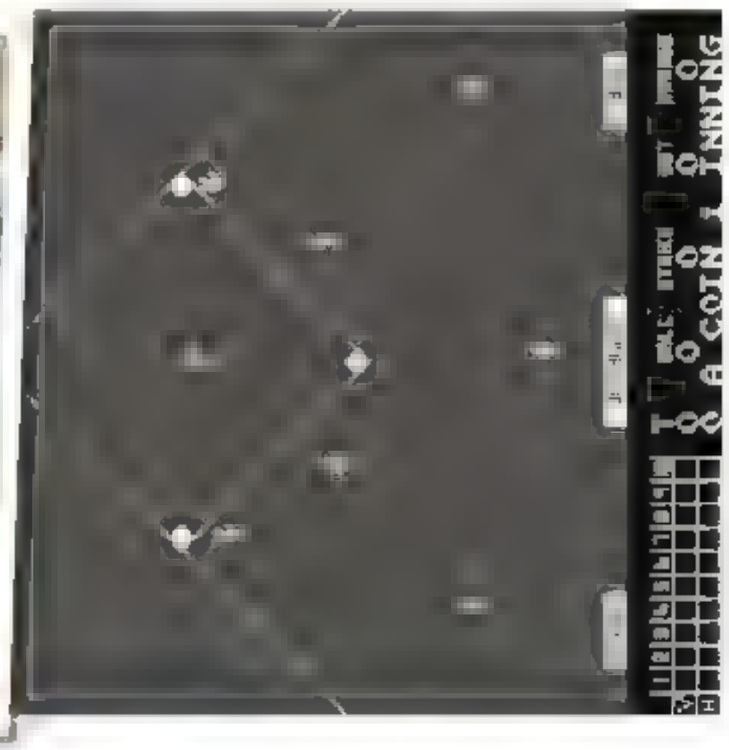
The head of the consumer division. It didn't help matters that Nolan began butting heads with Warner on issues like the future of the pinball division, or even the future of the VCS.

By the autumn of 1978, Nolan had crossed the line by trying to hold meetings in secret without Warner staff. Warner put Nolan out to pasture after a reorganisation plan and, like Ted years before, he was left with no recourse but to quit that December. Ray Kassar was now left in ▶

HOLOGAMES

As the electronic toys craze hit in the late Seventies and early Eighties, Atari had a brief foray into its own handheld electronic devices and board games under its new electronic games division. Starting in 1978, Atari released *Touch Me*, a handheld game based on its own arcade game of the same name, which competed with and lost against a game from Milton Bradley inspired by *Touch Me*, *Simon*. Atari planned to follow up with handheld games based on arcade properties like *Breakout* and the licensed *Space Invaders*, and even planned advanced tabletop hologram-based products like the Atari Cosmos and Atari Spector Axis, it was never to be. By the early Eighties, the electronic games market was tapping in the US and Atari shut down the division. Atari not only lost some advanced games in the process, but it lost the company's third employee Al Alcorn, who had been heading the Cosmos project and quit shortly after.

▶ Enjoying a round of *Battlezone* during its development are (left to right) Lyle Rains, Dona Bailey, Ed Rotberg, Jeff Boscole and Owen Rubin (seated).

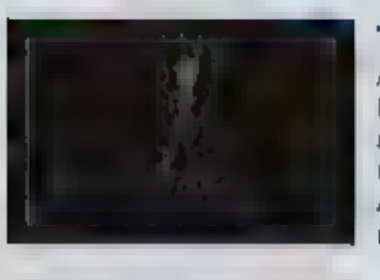


SIX OF THE BEST

Asteroids [1979]
The classic space shooter that influenced a generation, and it's still fun to play. While most will have to settle for playing this game on pixelated technology, nothing compares to playing in its original crisp vector monitor format

Centipede [1980]
Another innovative game, *Centipede* improves on the bug theme initiated by *Galaxian*. Set in a dynamically changing garden playfield and complete with vibrant colour scheme, this top-down shooter proved a smash hit for Atari

Warlords [1980]
Still one of the best multiplayer video arcade games of all time, its home port for the 2600 was just as fun and one of the only times you'll hook up four paddles. The arcade version includes a breathtaking 3D cut-out reflected backfield

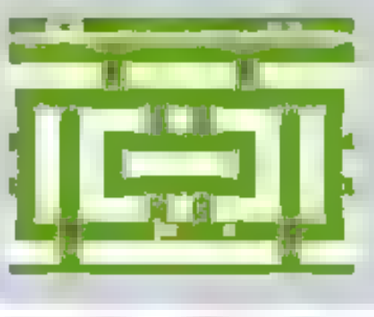


Tempest [1980]
Atari's first colour vector game, this fast-paced shooter that has you rotating around geometric shapes is again one that just looks best on a vector monitor. A capable home version wasn't released until *Tempest 2000* for the Jaguar

Missile Command [1980]
Global thermonuclear war, Atari style. The home ports dumbed down the gameplay for use with a single joystick and button. Accordingly, Atari engineer Dan Kramer was inspired to design a home version of the arcade trackball

Tank [1974]
A classic that many will never have a chance to play, as it's a discrete logic game that therefore cannot be emulated. It's satisfying using dual sticks to manoeuvre your tanks through a maze while you attempt to blast your opponent

ONE TO AVOID



Slot Racers (2600) [1978]
This, Warren Robinett's warm-up game for the much more successful *Adventure* is Atari on autopilot. While an original concept, it was done better in later coin-ops like *Spectar* and *Targ*. 2600 games are not known for their inspired graphics, but the cars don't even look like cars

» Two shirts designed by Dan Kramer for internal use at Atari to celebrate the release of his Atari 5200 Trak-Ball

charge and began heading what many consider the golden age of the company, if not the entire Atari brand. Not without a little speed bump to start out with, though.

Under new management

Shortly after coming to the company, Ray had begun bumping heads with some of the Video Computer System programmers, calling them "high-strung prima donnas" in an off-the-record portion of an interview with the *San Jose Mercury News* that ended up getting published. A meeting designed to be a pep talk in early 1979 proved to be the last straw for some, as he managed to alienate even more.

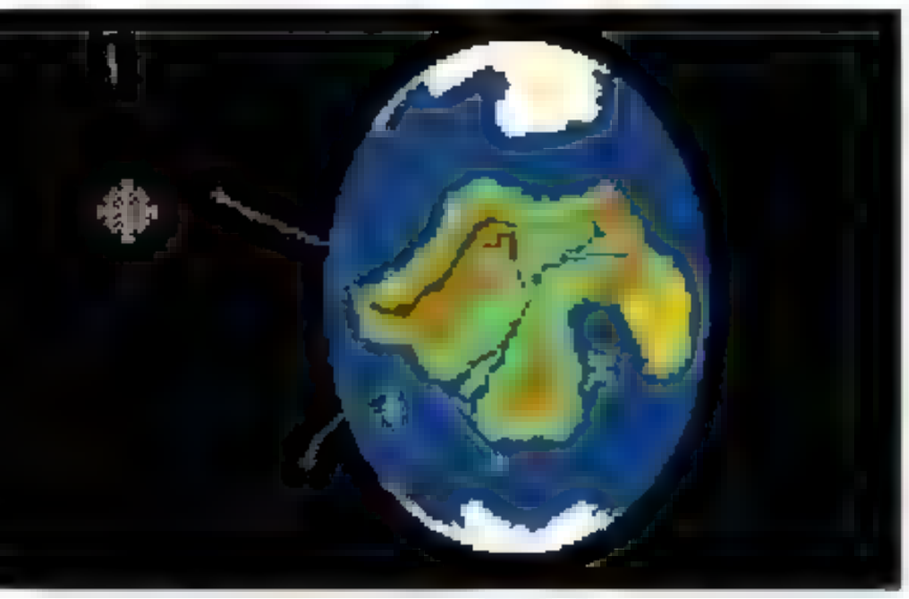
VCS and Atari 400/800 engineer Joe Decuir related: "Ray called a meeting of the entire engineering team, coin-op and consumer – a bit of 'blah blah' and then he started talking about what we were going to do. He was excited about the [400 and 800] computer. He said we were going to sell them in designer colours so that women would buy them, and that we would also have home decorating software. A number of women I knew in engineering decided to resign because of this. One of the VCS programmers asked him how he was going to deal with the creative talent – the game designers. He said he knew about creative types from dealing with towel designers at Burlington Mills, his previous company. A core of programmers were disgusted, and formed Activision."

Fortunately, much of the coin-op talent stayed on to thrust Atari to the front just as the market began exploding thanks to Taito's *Space Invaders*. A string of now-iconic hits were released from 1979 onwards, including *Asteroids*, *Battlezone*, *Centipede* and more. The consumer division and its Video Computer System rode the wave in 1980 after a timely licensing of *Space Invaders* for the console came to fruition. Giving the lagging console its killer app, it was soon joined by an expanding third-party market thanks to Activision, and sales really took off.

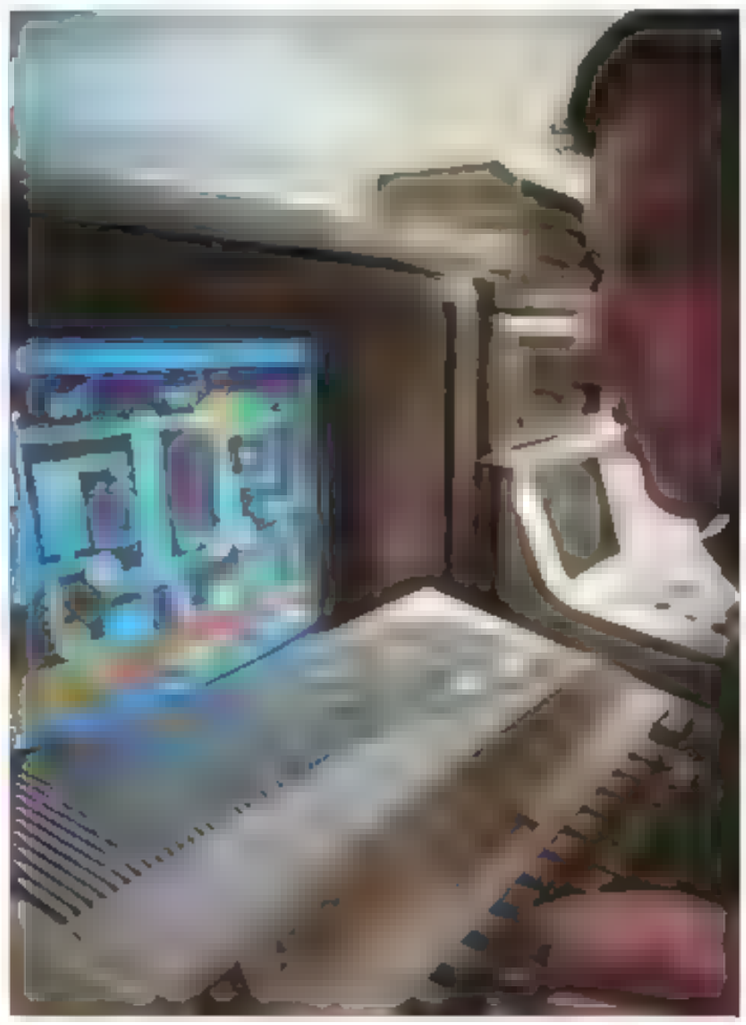
The catalyst for Atari's golden age was Warner Communications itself. As a powerhouse media company, it began leveraging its wide net of subsidiaries to add to Atari's public presence in the videogame craze of the early Eighties that it dominated. What many now take for granted or attribute to Nintendo during its Famicom/NES heyday was actually pioneered by Warner during this period. Atari-themed magazines, movie placements, toys, clothing, party favours, costumes, jewellery, storybooks, big budget cinematic commercials, collectables and more built the brand into a commercial juggernaut.

By 1982, Atari had become Warner Communications' golden goose. Comprising 80 per cent of the videogame industry, Atari was doing slightly over $2 billion in sales and producing more than half of Warner's $4 billion in revenues, and over 65 per cent of its profits. Warner saw only continued growth, and did what it could to force what should have been considered unmanageable growth, if not a bubble waiting to burst. This included frequent second-guessing of Atari management, creating a dual management. Money-losing deals such as the now-legendary *E.T.* tie-in were forced on Atari, and a string of ongoing projects that would have put the company far ahead in both consoles and computers were cancelled in favour of more incremental advancements like the Atari 5200 console and the XL series of computers. Not that some of Atari's management, such as Ray Kassar, weren't enjoying their perks: Learjets, limousines, yachts and luxury office remodelling were all on the menu.

The signs of the end for the company were beginning as it enjoyed its record profits that year. By August of 1982, warehouses around the US began piling up with unsold inventory thanks to the glut of competing consoles on the market. As Gordon Crawford, a representative of the investment group that brokered the original sale of Atari to Warner, related: "At the January '82 Consumer Electronics Show there were three or four new video hardware systems and about 50 new software systems – all the warning lights went on for me. Then, at the June CES, it was worse! There were about 200 software systems. This was a business where the year before it had been



▲ The Atari Spectar a 'holoptic tabletop game that never saw release



essentially a monopoly, and now there were literally hundreds of new entrants."

Warner and Atari management became partners in a cover-up of how Atari was starting to suffer. Producing artificial reports and a trumped-up projection of earnings for the final part of 1982, members in both management groups began selling off shares to insulate themselves. The most notorious example was Ray Kassar himself, who did so shortly before the December 1982 announcement that earnings were far short of the previously announced projection. It eventually led to him being forced from his position at Atari by that summer, but the damage was already done to the industry.

The bubble bursts

Shock waves spread as investors began to question the viability of the entire videogame industry, and stock prices plummeted. Layoffs began at Atari that January, and throughout the rest of 1983 and 1984 many of these new competitors that Crawford had witnessed began closing. The videogame market crash had begun.

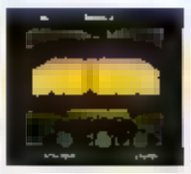
Atari tried to minimise its losses by starting up advanced research divisions in computing and graphics, as well as expanding its areas of consumer reach in markets like next-generation medical devices and telephone research. By September of 1983, Warner brought in James Morgan, VP of tobacco company Philip Morris, to replace Kassar and turn the company around. However, Warner began mounting heavier and heavier earnings and stock losses as Atari lost millions a day, and by winter of 1983 Warner itself was facing a hostile takeover by Australian publishing magnate Rupert Murdoch. In January of 1984, Warner brought in a firm to evaluate all its holdings and formulate a plan of action, and Atari was at the top of the list of subsidiaries that it was suggested to dump. The Murdoch takeover was averted that March after Warner bought out his stock, but the writing was already on the wall for Atari. Warner began looking for companies to buy it outright, but when it couldn't, Atari was split into pieces.

The consumer division and most of Atari's manufacturing and distribution capabilities were sold to Jack Tramiel in exchange for no money down and the taking on of most of Atari Inc's debt. Folding it into his Tramel Technologies Ltd (TTL), he renamed TTL to Atari Corporation and began a new chapter of the Atari brand in the consumer arena. The still-profitable coin division, responsible for Atari's incredibly prolific arcade output, was initially kept and reformed as Atari Games, and soon after majority ownership was sold to Namco of *Pac-Man* fame.

Much like a last-second swoop of the paddle in *Pong* to save you from your opponent scoring that winning point, the Atari brand was rescued from being completely wiped out in 1984 and would survive the crash. However, the drama, successes and failures of the well known company were to be far from over.

Special thanks: Curt Vendel, Jerry Jessop, Ted Dabney, Allan Alcorn, Steve Bristow, Owen Rubin, the Smithsonian.

THE NAMCO CONNECTION



In 1974, due to mounting losses, Atari decided to sell its fledgling Japanese operation, run by Hideyuki Nakajima, to Namco. Hideyuki agreed to stay on and run Namco's new division, which would initially release licensed Atari games before moving on to producing its own. Thus started a long partnership between the two companies. By the early Eighties it was Atari that was licensing Namco games, and these were such big hits that many are frequently heralded as Atari games. Titles today such as *Dig Dug*, *Pole Position* and *Xevious*. By February 1985, Namco purchased the Atari arcade division, by then known as Atari Games. Hideyuki was sent to oversee all of Namco's US operations, and by 1987 had pooled his own money together with other Atari Games employees to buy the company from Namco and make it employee-owned. Shortly after the purchase he created Tengen to allow Atari games to enter the home console market in 1987. Hideyuki and the rest of the Atari Games staff sold their company back to Warner, then known as Time Warner. Sadly, Hideyuki's long association with the Atari brand would itself end later that year when he passed away on 11 June 1994 from lung cancer.

That Lasts a Lifetime.

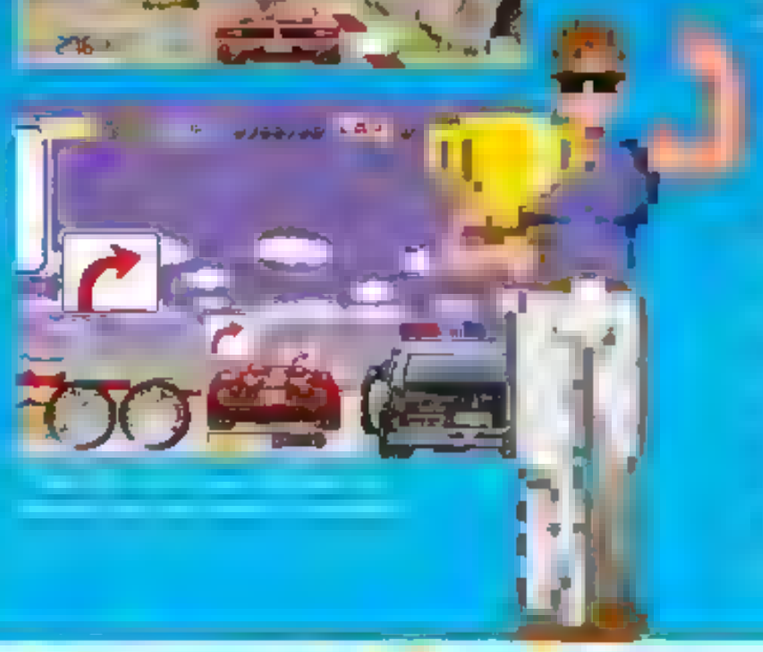
▶ In the early Eighties, special summer camps dedicated to personal computers started springing up, with parents sending their kids in the hopes of getting a head start in this new field. Atari ran several camps across the US, where kids could program their Atari 800 in between distractions like swimming and hiking.

The Road Trip of a Lifetime

Crust

Run

Out Run



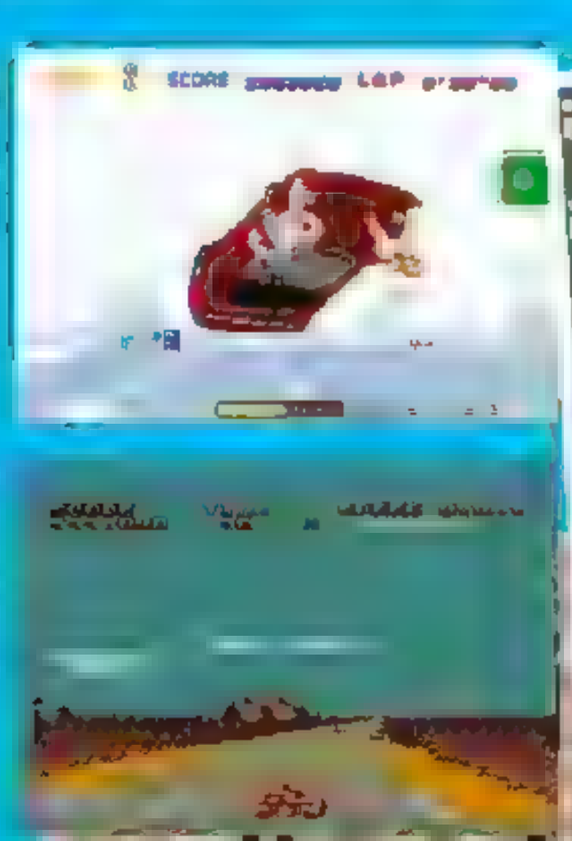
Did you know?

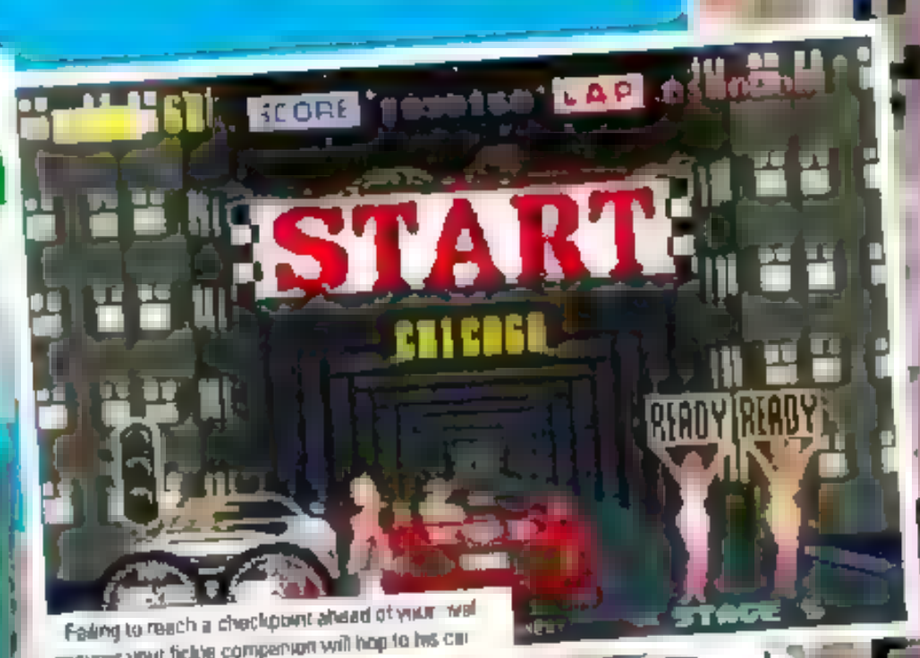
- *Out Run* was originally designed to include motorbikes and oncoming vehicles amongst the traffic

Team Files

"It was probably the summer of 1987 and it was pretty mind-blowing for me"

With





Failing to reach a checkpoint ahead of your rival ensures your fickle companion will hop to his car

Data Discs Interview

We talk to Jamie Crook to find out why Out Run's soundtrack has stood the test of time

When did you first hear *Out Run*'s music? What impression did it make on you?
Probably on the Mega Drive. I grew up in a small town in Devon, so we didn't have access to many arcade machines at the time. It wasn't until much later that I heard the arcade version, which is, of course, the superior one. I had a friend at University about 14 years ago, who used to listen to the *Out Run* soundtrack on a Sony Walkman in between classes. He was always praising it, so revisited it then too. It never gets old.

The three main *Out Run* tracks have been remixed and arranged frequently over the years, and they always manage to remain relevant. What do you think gives them this timeless quality?
Hiroshi Kawaguchi is a clearly gifted composer who, despite working in an extremely restricted medium, produced something really special. The tracks are all well structured, with hooks in all the right places and memorable rhythms running underneath. It's just great songwriting. Simple as that.

What was *Out Run* doing differently to other games of the mid-Eighties in terms of its sound and music?
In the Eighties Sega was at the cutting edge in the arcades. Hiroshi Kawaguchi worked with their machines from really early on, which I think gave him an intricate understanding of the technology and its restraints from the outset. Beyond that, I think he also cared deeply about song structure and the pivotal role played by music within the game. It's clear there was a lot of thought put into the music in *Out Run*, which perhaps was missing from other games. The music was always designed to be fundamental to the experience with each track having its own distinct flavour.

What drove you to release the *Out Run* soundtrack on vinyl?
It's a timeless soundtrack that can be enjoyed as a standalone album, irrespective of whether you're familiar with the game or not. It's just really good music.

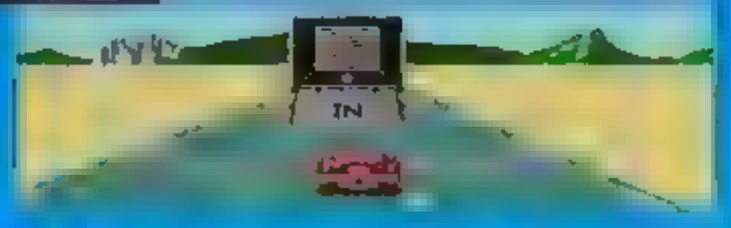
***Magical Sound Shower, Passing Breeze* or *Splash Wave*? No cop-outs!**
Passing Breeze. That bass-line.

Look out for *OutRun* on vinyl this summer. More info at data-discs.com

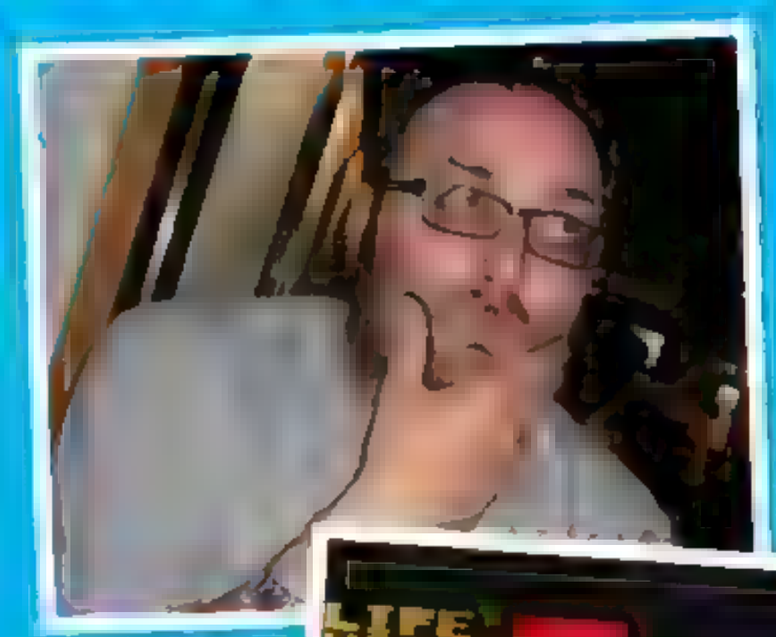
Did you know?

■ The Dreamcast and 3DS versions of *Out Run* include a redrawn car sprite to avoid copyright infringement.

Out Run



"To be honest, I always preferred the original game and its sense of freedom."



Did you know?

■ The Saturn and 3DS versions of *Out Run* improve on the original by doubling the frame-rate.

The End Of The Road

If you have a favourite route, you might not know Out Run has an ending for each of its goals – and here's what happens in each of them

■ Having reached the end of the game's easiest route, our illustrious driver is hoisted aloft by a crowd of cheering spectators. Unfortunately they're all easily distracted men. When a pretty lady stops by, they all stop to gawk at her and drop our man. Poor form, chaps.

■ Congratulations, you've driven a long way from home! Commiserations, your Ferrari has broken down. We're not sure where the nearest Ferrari repairer is, but we're guessing that it's nowhere near here. Oh, and it's the Eighties so you probably don't have a mobile phone.

■ What's most important about *Out Run* to you? If it's the female companionship, the middle route is where you want to be. Having been presented with a magic lamp, our driver receives his wish, which turns out to be a harem. Your passenger doesn't look best pleased with that.

■ Will this ending finally play it straight? It seems so, as someone wanders towards you with a trophy for your achievement – only to saunter straight past you and present the trophy to your female companion. Hang on a minute – was the steering wheel on the right, then?

■ For the master driver that reaches the most difficult of *Out Run*'s goals, there is no joke or calamity – you're presented with a well deserved trophy for your frankly excellent driving. Now you've truly mastered the original *Out Run*, it's time to try one of the sequels.

Out Run

La Scuderia Rossa

OutRun has always been most closely linked with Ferrari, and here's every model featured in the series...

250 GTO

365 GTS/4 Daytona

Dino 246 GTS

512 BB

Testarossa

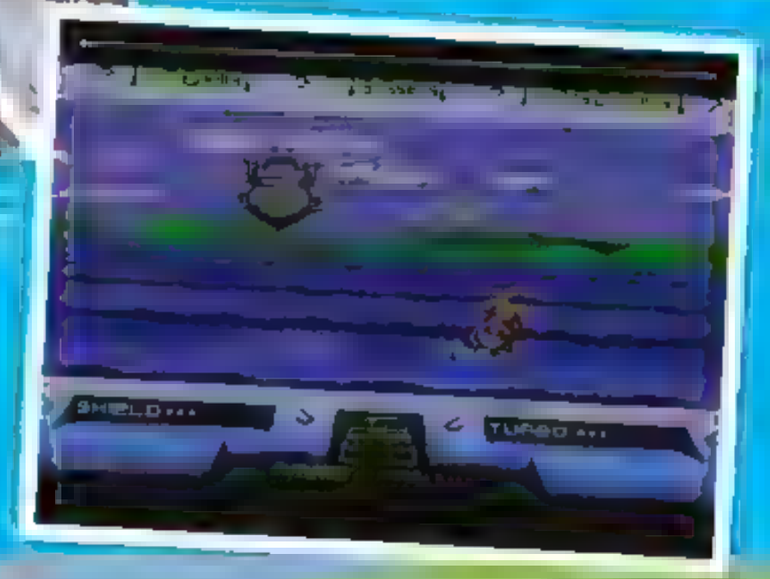
288 GTO

328 GTS

F40

Did you know?

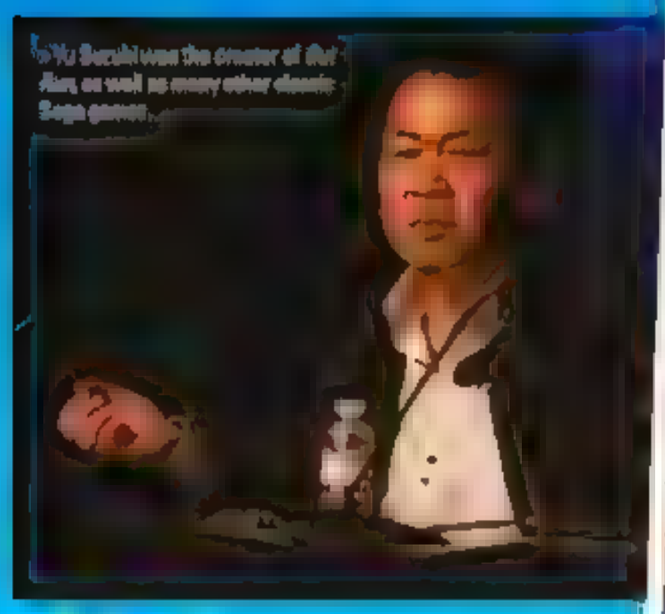
■ *Out Run 3-D* includes support for the Japan only Master System FM sound unit, despite not being released there



"Four-player races still had that sense of calm I cherished from the single-player."

Did you know?

- The Mega Drive version of *OutRunners* includes the *Virtua Racing* car as a bonus, but only in Japan

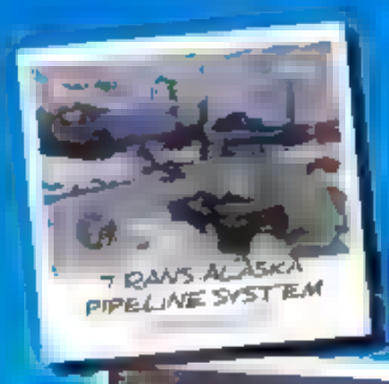


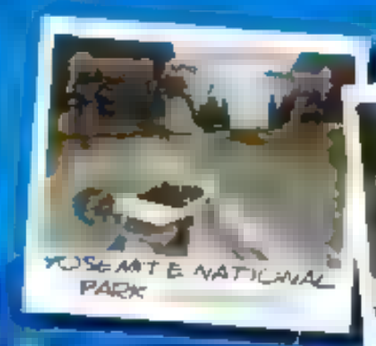
The brightly-lit streets of *OutRun 2 SP*'s Casino Tower are clearly inspired by Las Vegas

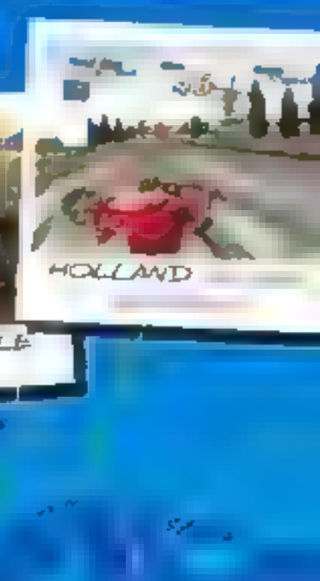
OutRun

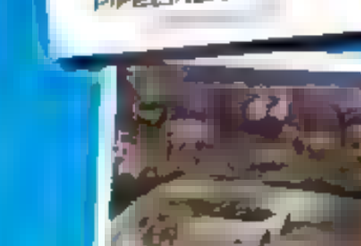
Around The World

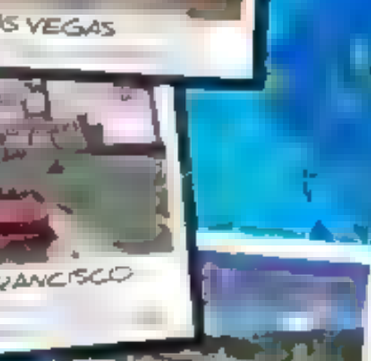
Your guide to the key locations you can visit in the OutRun series!



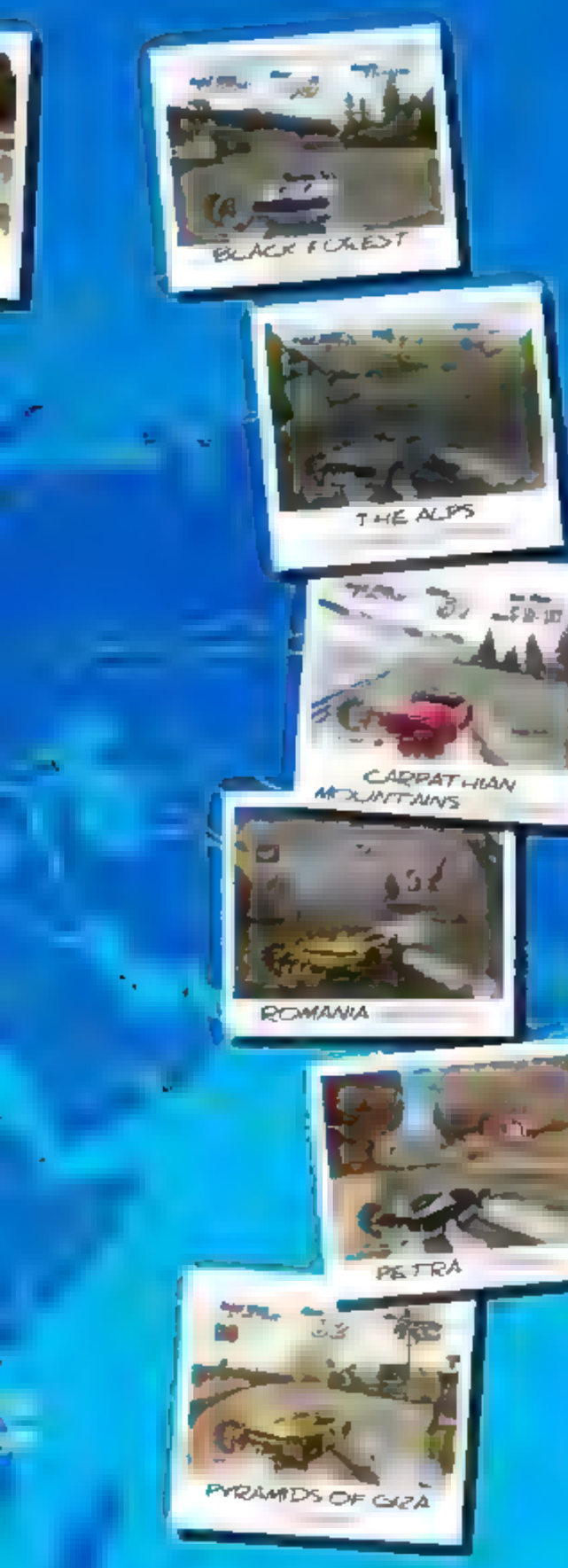








America



"I would use the newest technology to make the world's most pleasurable driving experience"

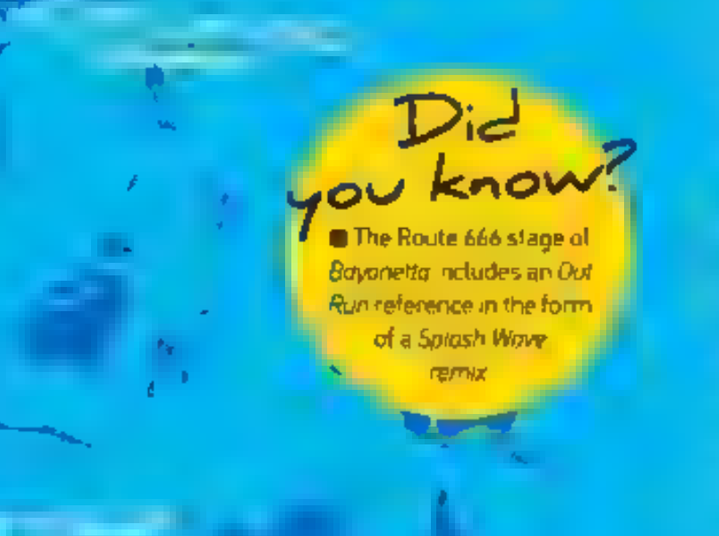
RUSSIA

CHINA

Did you know?

- The Route 666 stage of *Bayonetta* includes an *Out Run* reference in the form of a *Splash Wave* remix

Europe

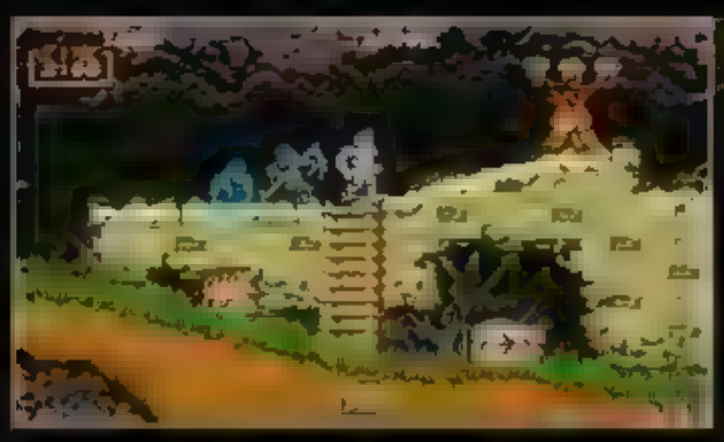


Drifting is crucial to success in the whole *OutRun 2* family of games, no matter which course you play

Coast 2 Coast is an excellent mode that's chocked full of challenges to complete

GHOULS 'N GHOSTS

Arise Knight Arthur! The dead are abroad and the princess has been taken. Lances will be lobbed, monsters will be mashed, underpants will be aired. As Martyn Carroll discovers, it's all in a knight's work



Taking the high path is usually the best, if only to prevent nasty things dropping on your head.

***Ghouls 'N Ghosts* opens on a dark and stormy night.** Ominous clouds gather and lightning pierces the gloom, but Arthur fears not. He bounds through the boneyard on his quest to save his loved one and overthrow the forces of darkness.

There's a definite scene of déjà vu hanging over this scene. In *Ghosts 'N Goblins*, released three years earlier in 1985, Arthur found himself in a similar cemetery, knee-deep in the undead, with the same noble quest ahead of him. Even the soundtrack was the same, albeit in an earlier arrangement. The difference was the visuals. Arthur and the enemy sprites were now larger and more detailed, allowing series director Tokuro Fujiwara to better realise his aim of creating a game filled with cartoon-quality characters. But it was the background graphics that really made the difference. Gone was the sparse scenery of the original, replaced by beautifully-drawn backdrops that scrolled on a separate layer, creating a convincing parallax effect. Add in the visual tricks, like the first stage's stormy weather, and the result was a platformer filled with atmosphere.

The improved aesthetics were down to Capcom's CPS-1 hardware. *Ghouls* was the second title to use it – shooter *Forgotten Worlds* being the first – and the custom 68000-based 16-bit system gave the 2D visuals a clear boost. In contrast the original game ran on a 6809 CPU, the same processor used in the Commodore SuperPET and Tandy CoCo. If the original was a 16mm movie then *Ghouls* was the 35mm ▶

> **"The improved aesthetics were down to Capcom's CPS-1 hardware. Ghouls was the second title to use it"**

PIXEL PERFECT

The game's gorgeous sprites, laid bare for your viewing pleasure

Arthur

Arthur (Magic Armour)

Arthur (Underpants)

Arthur (Old Man)

Arthur (Duck

Chest

Magician

Skeleton Murderer

Vulture

Flame Skull

Flying Goblin

Guillotine

Evil-faced Tower

Ogre Mayfly

Rock Turtle

Orc Man

Man-eating Flower

Red Arremer King

Beholder

Fire Bat

Antlion

Sonic Weasel

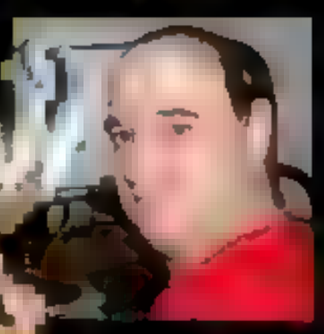
Armoured Mud Man

Mud Hand

Princess Prin Prin

DEVELOPER Q&A

Programmer Ste Ruddy reflects on his cracking Commodore 64 version



How did you get to work on the conversion?
Software Creations was doing a fair bit of work for US Gold and it was really just the next game I got following on from *LED Storm*. It was my last C64 game as I was doing more and more NES work.

Had you played much of the game beforehand?
Sadly not. I'd played *Ghosts 'N Goblins* to death but I hadn't seen *Ghouls 'N Ghosts* in the wild until well into the development of the game. By which time I was quite good at it, although not keen on paying to play!

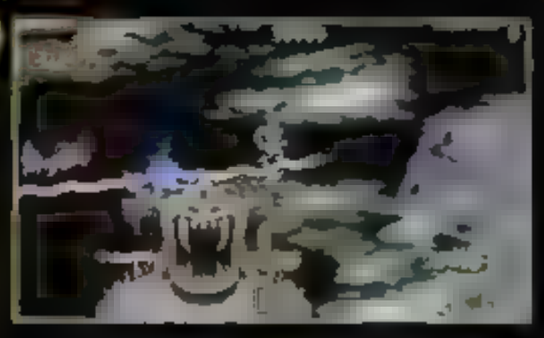
How much help did you receive from Capcom?
We didn't get any, really. We received a board from US Gold and that was it. Fortunately it was one with a debug mode, so I do remember Andy Threlfall [the graphic artist] spending quite a lot of time staring at the test graphic pages. Apart from that it was just a case of playing the game over and over. It was a hard job but someone had to do it.

What were the trickiest parts of the game to replicate?
Well, technically, it was a full-screen colour scroll. Chasing the raster to update the colour was always fun, with an optimised sprite multiplexor supporting some of the massive sprites that the game used. But, to be honest, just fitting the sodding thing into the memory of the C64 was probably the trickiest part of the port.

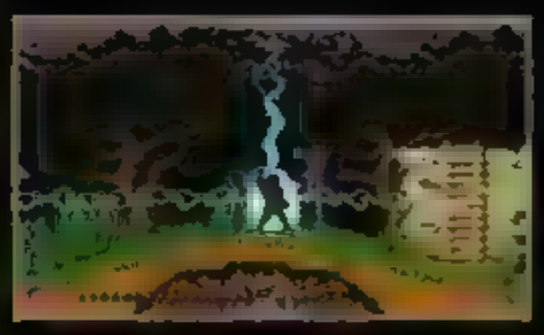
What aspects of the port are you most proud of?
Getting a playable interpretation of the arcade *Ghouls 'N Ghosts* using a joystick.

And which parts do you wish you could improve?
The most annoying thing was the fact that we were rushed right at the end to get it out. This meant some silly bugs slipped through. I'd have loved just a couple more weeks to fix 'em.

How do you feel the port holds up today?
I think it's a good interpretation of the arcade game. The graphics are good, it's playable and has awesome music. That said, being a programmer, I look at it and think of all the things I could do better now.



▲ Arthur goes tongue surfing in the tricky third stage. Try not to get chomped.



▲ Arthur lights up the screen, and sends the dead scampering, with a charged-up magic attack.

▶ remake – *Evil Dead* versus *Evil Dead 2*, if you like. *Ghouls* was also able to maintain its artistic flair throughout the game. The original became quite drab and samey once you ventured underground and into the castle, yet the follow-up continued to delight with its increasingly imaginative stages (the third stage, Baron Rankle's Tower, where Arthur had to traverse wiggly gargoyle tongues, was a highlight). And then there were the bosses. Who could forget Shielder, the first stage's green-skinned guardian who held aloft his own fire-spitting skull? Screenshots of this encounter were common in magazines, showing how the boss dwarfed poor Arthur. In action it was even more impressive as Shielder stomped around the screen, arms waving and tail swishing. The new bosses were so imposing that Astaroth, the chief baddie from the first game, was relegated to mini-boss status. His crown was assumed by Lucifer, a mega-boss who literally filled the screen.

As in the original game, to reach the final boss you had to play through the game *twice* – only then, providing you collected the powerful Psycho Cannon

BOSS RUSH

The chief architects of evil and how to topple them

SHIELDER

■ The game's first boss certainly makes an impression. Having defeated dozens of regular-sized foes you're suddenly hounded by this snarling giant who pulls off his own head and spits fireballs at you. He also tries to stomp you with his massive clawed feet.

How to beat it: In classic *Monty Python* style: run away! Then, as he follows and lowers his head, turn and fire straight into his face. Basically, keep your distance.

CERBERUS

■ This boss leaps from the flames that engulf the end of the second stage. The 'Hound Of Hades' blazes across the screen, leaving behind a fiery – and deadly – trail. He also conjures up deadly fireballs that rain from the sky. All of this ensures you receive a toasty reception.

How to beat it: The best technique is to crouch in the centre of the screen (to avoid his leap) and then hit him when he lands. Don't forget to dodge the falling fireballs.

weapon on your second run-through, could you finally face Lucifer. For many players the prospect of finishing the game just once was a distant dream - the series is famous for its notorious difficulty level and *Ghouls* only enhanced that reputation. As before, randomly-spawning enemies made life extremely tough and it wasn't possible to change your direction when jumping, so accidentally leaping to your doom was a common occurrence. Perhaps the biggest annoyance was the weapon system which was carried over from the first game. You couldn't drop and swap your weapons, so if you unintentionally picked up one of the lesser weapons you were stuck with it until you found an alternative.

Ghouls did bless Arthur with some new abilities. You could now shoot arrows vertically as well as horizontally – perfect for targeting flying nasties. The game also introduced the magical gold armour, which, once worn, let you unleash special charged-up attacks. These additions did make the game slightly easier, but make no mistake, it was still *really bloody hard*. Perseverance paid off, however, as the warped stages and outlandish bosses that lay ahead were ample reward. Plus, anyone who could one-credit *Ghouls* was instantly crowned King Of The Arcade.

> **"The most annoying thing was the fact that we were rushed right at the end to get it out"**
> Ste Ruddy

The game debuted in Japan in December 1988 under its original title of *Daimakaimura* (Great Demon World Village). The following month it arrived in the west at London's ATEI show where Newsfield's Robin Hogg played it and considered it to be one of Capcom's finest games. "*Ghouls 'N Ghosts* is a considerably stronger title than nearly all other Capcom games so far," he reported in *The Games Machine* magazine. "The graphics have to be seen to be believed and the thoroughly addictive gameplay should see the crowds flooding to the arcades." ▶

Arthur, clad in his Magic Armour, takes on Astaroth and his clone.

GASSUTO

■ As the name suggests this boss is a swirl of hot air. At its core is an evil eye that keeps you forever in sight. Occasionally the eye will get mad and emit lightning that leads to a brief storm. The boss also swells in size, making it more difficult to avoid.

How to beat it: This boss will basically circle you so just keep hitting the eye as it goes around. A good projectile weapon, such as the dagger or discus, is required.

ASTAROTH

■ Regular series boss Astaroth returns to bother Arthur towards the end of the fifth stage. He will try and frazzle you with flames emitted from either of his grinning mouths. As he's a master of illusion you also have to beat two 'clones' a little later on in the brawl.

How to beat it: As with Shielder, stay back and just keep jumping up and hitting him in the head. If he gets too close crouch quickly to avoid his flame attack.

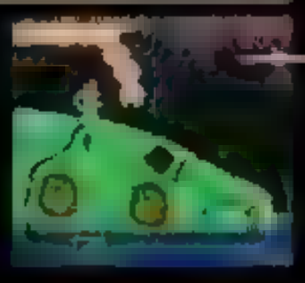
LUCIFER

■ The final, *final* boss of the game can only be confronted if you're carrying the Psycho Cannon (available on your second playthrough). The bad-tempered Lucifer doesn't budge from his throne but he'll attempt to crush you underfoot and zap you with his laser fingers.

How to beat it: Don't be deterred by his size. Stand just to the right of his left foot and blast the Psycho Cannon into his face. A dozen or so hits will finish the job.

OHME

■ The biggest boss in the game is several screens in length and appears to be some kind of rotting fish beast. Ohme doesn't actually move but its bloated body secretes maggots and worms that try and prevent you from destroying their disgusting host. Eww.



How to beat it: Avoid the maggots and just try to concentrate on shooting the boss's protruding innards. Begin with the middle one and then work outwards.

BEELZEBUB

■ Ostensibly the final boss, this giant fly blocks the exit to the fifth and final stage. It continually changes between his true form and a swarm of smaller flies that buzz around the screen. It will also fling green blobs of death at you, plucked straight from its abdomen.

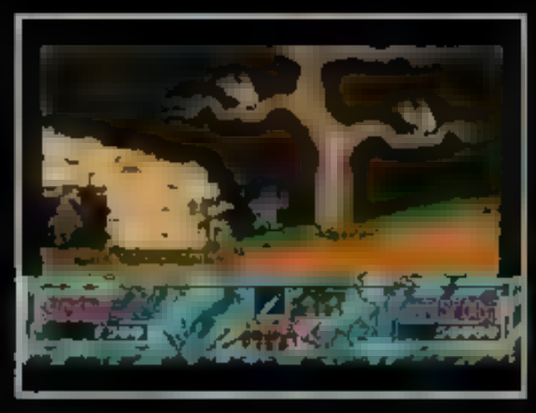
How to beat it: Run to avoid the swarm and then hit it hard when it forms into a fly. Using the dagger's doppelganger magic will make quick work of this one.

CONVERSION CAPERS

How the various home versions measured up

ZX SPECTRUM

■ Topping Elite's Spectrum version of *Ghosts 'N Goblins* wasn't going to be easy but Software Creations managed it, just. There isn't much colour or background detail on display but all of the stages are here and it plays really well. The 128K version is the one to go for, as there's no annoying multi-load and it features Tim Follin's excellent AY tunes and effects.



ATARI ST

■ It took Software Creations 12 months to create the ST version and it was time well spent. The colours are muted and the scroll isn't as smooth as you'd hope but it's a faithful conversion. Once again Tim Follin worked his audio magic, producing a series of original compositions alongside arrangements of the coin-op's tunes.

AMIGA

■ Arriving a few weeks after the ST release, Software Creations went back and enhanced the graphics for the Amiga version. Compare the screenshots: the Amiga version features a taller display and includes more detail, such as the clouds and background trees. The only thing missing is the parallax scrolling effect.

COMMODORE 64

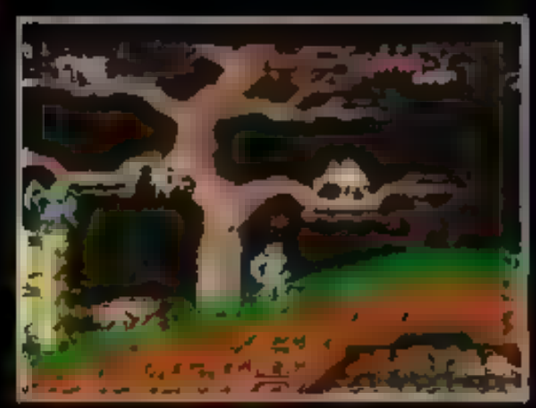
■ This C64 game is held in high regard, and it's easy to see why – it's a conversion masterclass. The graphics, the animation, the attention to detail: everything about it is impressive – and, of course, Tim Follin's SID tunes are simply out of this world. It's hard to imagine how Software Creations could have executed this any better. It's real "lightning in a bottle" stuff.

MEGA DRIVE

■ This was one of several early titles that highlighted the Mega Drive as a capable platform for coin-op conversions. It's not arcade perfect – the animation is a little choppy and some visual tricks are missing – but it's nonetheless a very fine version that unsurprisingly became an import favourite. The 'practice' mode is a nice addition, resulting in less hair-tearing.

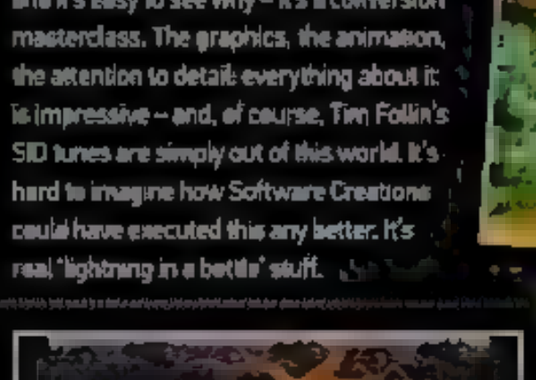
AMSTRAD CPC

■ The CPC version is much more colourful than its Spectrum counterpart, but it's let down by its scrolling, being the only home version to 'push scroll' when you reach the edge of the screen. Not having Arthur fixed in the centre means it is easy to run into nasties when the screen scrolls, and it's worse when climbing as the screen scrolls horizontally then vertically.



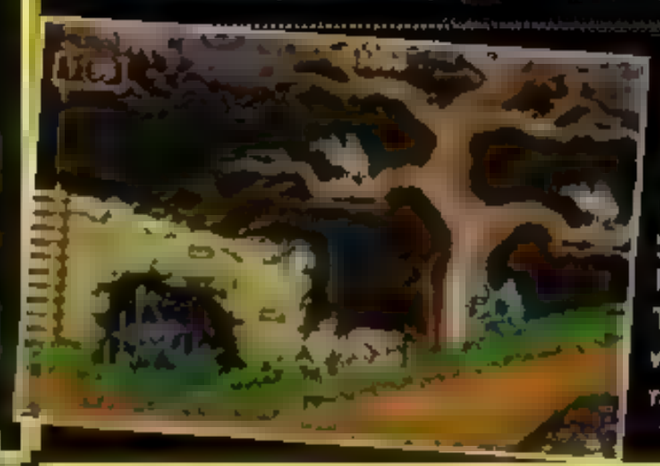
SUPERGRAFX

■ *Ghouls 'N Ghosts* was one of just seven titles released for the enhanced PC Engine. The sound and graphics don't quite match the Mega Drive version, but the hardware's extra memory is used to improve the animation. In short, the game runs better on the SuperGrafx compared to the Mega Drive. It also includes the full opening scene from the original coin-op.



MASTER SYSTEM

■ Sega did an admirable job of replicating the game on its 8-bit Master System console. Movement is quite slow but this has the benefit of making the game easier. It also features unique "shops", accessible via certain chests, that let you upgrade Arthur's helmet, body armour and boots. This adds a splash of strategy and makes up for any technical shortcomings.



SHARP X68000

■ The Japanese computer hosts many arcade-perfect conversions and *Ghouls* is a great example of this. It may have arrived six years after the coin-op but if you run them side by side you'll not be able to tell them apart. There's also a bunch of options to play around with, including multiple difficulty settings ranging from very easy to, gasp, very difficult.

PLAYSTATION/SATURN

■ The first three games were brought together for the second *Capcom Generations* collection which was subtitled *Chronicles Of Arthur*. In addition to arcade perfect ports there's a fascinating library featuring game history, original artwork and playing tips. Prior to the later *Capcom Classics Collection* this was the must-have compilation for fans of the series.

SPOOKY SEQUELS

AKA 'The Further Adventures Of Knight Arthur In The Demon Realm'

SUPER GHOULS 'N GHOSTS

» **PLATFORM:** SUPER NINTENDO

» **YEAR:** 1991

■ SNES owners rejoiced when Capcom announced that the third game in the series was a Nintendo-exclusive title. It was essentially more of the same, with Arthur blessed with new weapons and abilities, including the all-important double jump. The graphics and animation were great, although the game suffered from slowdown when the action intensified.

MAKAIMURA

» **PLATFORM:** WONDERSWAN

» **YEAR:** 1999

■ This often-overlooked fourth entry was released exclusively in Japan for the monochrome WonderSwan. Despite the title, and the return of enemies from the earlier games, this was a distinct entry in the series that featured imaginative stages and bizarre bosses. It was also brutally difficult, as you'd expect, without the double jump to save your skin.

ULTIMATE GHOSTS 'N GOBLINS

» **PLATFORM:** PLAYSTATION PORTABLE

» **YEAR:** 2004

■ Following the two *Maximo* spin-offs Capcom returned to the series roots with a classic 2D entry that benefited from wonderful 3D-style backgrounds. Arthur was now more athletic than ever, being able to block, dash, climb and even fly. His task was no easier, however, as the trademark difficulty returned with a vengeance (though there was a novice mode).

GHOSTS 'N GOBLINS: GOLD KNIGHTS

» **PLATFORM:** MOBILE/IOS

» **YEAR:** 2015

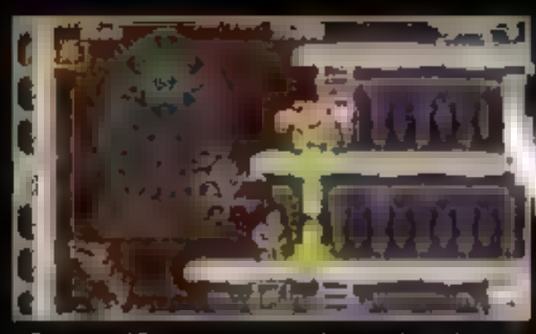
■ Arthur returned for this new two-part challenge – and he wasn't alone, as you could now choose to play as different knights with unique abilities. The gameplay was largely unchanged, though it was more forgiving than before (a good job, given the touchscreen controls). Various 'cheats' could also be purchased for real-world money. Hmm...

Ghouls and other Capcom titles, such as *Strider* and *Final Fight*, helped establish the CPS-1 board as an arcade mainstay. As the titles were 2D and sprite-based they lent themselves to home conversions and many followed. The first conversion of *Ghouls* hit the Japanese Mega Drive in August 1989. It was coded by Yuji Naka, who would go on to head up Sonic Team, and was admirably close to the coin-op (Fujiwara once joked that the Mega Drive version even featured the same bugs as the original, suggesting that the 68000 code was ported to some degree).

In Europe US Gold picked up the *Ghouls* licence, as part of its ongoing deal with Capcom, and commissioned Software Creations to develop it for home computers. The 8-bit releases were generally very good (the C64 version in particular being a highlight), with the only real omission being the final battle with Lucifer (these versions ended when you swatted Beelzebub, the giant fly, although the Spectrum version did throw up an extra platforming section which led you to the princess). The ST and Amiga versions were both solid titles and they did feature the Lucifer fight, with the only difference being that you didn't have to battle through the game again to challenge him. All of these versions were enhanced by Tim Follin's fantastic audio work.

Versions for the Master System and the PC Engine SuperGrafx followed. There was no version for the Super Nintendo – it instead received Arthur's third outing, *Super Ghouls 'N Ghosts*, as the series made the jump to home systems (see box out). There was also the *Gargoyle's Quest* series for Nintendo systems, where one of the flappy little demons that menaced Arthur became the protagonist. The entertaining 3D spin-off *Maximo* was released for PlayStation 2 in 2001 and this was followed by a sequel.

In 1994, six years after the arcade debut of *Ghouls 'N Ghosts*, the first arcade-perfect conversion arrived on the Sharp X68000 Japanese computer. Ports for the PlayStation and Saturn arrived in 1998 as part of the *Capcom Generations* series that also included the first and third games in the series. The games also appeared on *Capcom Classics Collection* for PS2 and Xbox in 2005, and PSP the following year. *Ghouls* was absent from the recent *Capcom Arcade Cabinet* collection, raising the possibility that Capcom has future plans for the game. Hopefully, Arthur's adventure isn't over just yet...



» Excuse me! The party gets out of hand as the end of the night draws near.

» Watch out for the giant mud hands as you navigate stage four's slimy slopes.

» The ominous cloud and question mark telegraph that Arthur's quest isn't over.

» This cool doppleganger is one of the better power-ups to appear in the game.

THE EVOLUTION OF STREET FIGHTER

FROM HUMBLE ORIGINS TO A WORLD-CONQUERING FIGHTER

If there's one franchise that has changed the shape of gaming as we know it more than any other, it has to be *Street Fighter*. Having a friend or rival watch over your shoulder as you set a new high score and keenly input your initials (most likely in the form of some kind of shorthand profanity) is great and all, but having them eat humble pie from a plate made of your own skill? Priceless.

Street Fighter may not be solely responsible for the concept of competitive gaming, nor was it the first game to introduce the idea. But by allowing us to select a character we could identify with and make work, the *Street Fighter* series without doubt forged many of the tenets by which we currently (and probably always will) go head-to-head with each another under the watchful eye of a digital referee.

And *Street Fighter* has done so much more for us, too. It's given us the perfect way to vent frustration with the real world by wailing on virtual schmucks at the end of a bad day. It's given us a forum in which to chase our ideals of developing gaming skill, while so many other games just want to take us on a nice "experience" holiday or patronise us until we can't see straight. And it has defined, more than any other series, the rules under which modern gaming competition takes place.

It came from nowhere, another also-ran fighter somehow paving the way for a game and a franchise that would alter the gaming landscape forever, something that would shape us as gamers and change our perceptions of what games could and should be. Call it hyperbole if you want, but we defy anyone to name a more influential or important game than *Street Fighter II* – some on a par, perhaps, but none that could claim to have had a quantifiably greater and longer-lasting effect on gaming as we know it.

But it's an odd tale all the same, one where an innocuous fighter is somehow the basis for a sequel that takes the world by storm and spawns a million imitators. Later follow-ups proved *SFII*'s quality to be no fluke, Capcom's success story seeming y wrote itself as the franchise evolved. And while *Street Fighter II* might be the one game that stands out as defining the franchise, each chapter has its own story to tell and its own relevance in the grand scheme of things

The original's sketchy special move commands; the sequel's unexpected brilliance; *III*'s unwavering determination and peerless quality despite a dying market; *IV*'s ballsy rejuvenation of a genre long thought dead. Hell, all this rags-to-riches story is missing is a John Parr soundtrack and a kickass montage. Join us them as we retread the steps that took Capcom to unexpected greatness and established a franchise to be forever remembered as one of the classics. Not many games make it to 30 and still look so spritely, after all...

“While Street Fighter II stands out as defining the franchise, each chapter has its own story to tell”

STREET FIGHTER

HUMBLE BEGINNINGS

If it's true that the mightiest of oaks can grow from the sma last acorn, it's no great surprise that the unstoppable force that is the *Street Fighter* franchise came from something so microscopic in importance

Street Fighter was just one of any number of competitive fighting games to emerge in the mid-to-late Eighties, the only things really separating it from the rest of the pack being little more than gimmicks – a deluxe version of the cabinet featured large pressure-sensitive buttons rather than the simpler version's six-button layout, while electing not to inform the player about the existence of Ryu's special moves gave the game an air of mystery and excitement. The deluxe cabinets were later phased out as, predictably heavy-handed use in the search for the strongest attack led to damage, though the standard six-button system employed by many modern fighting games started life here

While the game itself was somewhat unremarkable in many respects, it did help launch the careers of some big names in Japanese development. The production and direction team of Takashi Nishiyama and Hiroshi Matsumoto would go on to join SNK and work on rival franchises *Art Of Fighting* and *Fatal Fury*, while Mega Man legend Keiji Inafune got his break at Capcom drawing up character portraits for *Street Fighter*.

The game proved fairly popular despite its simple premise, later being ported to just about every major home computer system at the time to mixed effect Tiertex, the studio responsible for handling the ports, even went so far as to release its own unofficial sequel in the form of *Human Killing Machine*, a fighter of questionable content based on the same engine as the version it developed for the ports of Capcom's game Cheeky, perhaps, but the 8-bit era was hardly a hotbed of morality

» Special move inputs don't always register properly making on-demand fireballs tricky

» Joe gets a little extra screen time in the game's intro punching through a wall to set the scene for the fighting extravaganza. Yo, Joe

> **“ Just one of many games looking to further the one-on-one fighter ”**

THE CHALLENGERS

Ryu

Always searching for stronger opponents in order to develop his skills, Ryu embodies purity – while others seek fame and fortune he seeks only to better himself. The face of the *Street Fighter* franchise and present in every single game to carry the name so far

Ken

Ryu's sparring partner and friend Ken Masters started out as an exact copy of the Japanese poster boy (and one that only appeared as player two's character in versus mode) but later developed his own traits. Fear his flaming Dragon Punch, and spamming thereof

Retsu

A disgraced Kenpo instructor Retsu s the first hurdle on your quest to winning the tournament. It's not hard to see why he bald guy hasn't appeared in another game since he goes down easy and doesn't have much in the way of special attacks.

Geki

The generic ninja will see you now. The expected array of shuriken and teleport attacks are all accounted for in this rather bland character, but it takes extreme intelligence to flesh him out according to the comics, he's an assassin from a rival clan to Joku's

Joe

A kickboxer and the first of two American opponents in the original, Joe is nothing special. And while he may not have come back to the *Street Fighter* tournament he may have been loitering outside some suggest that he's the blonde dude in the original *Street Fighter II* intro.

Mike

Legal issues forced Capcom to swap some of the character names in *Street Fighter II*, leading Capcom to argue that American boxer Mike and *SFII*'s Balrog (originally Mike Bison) are two separate characters. So that's canon now. Deal with it

STREET FIGHTER II

THE GAME THAT CHANGED EVERYTHING

Quite how Capcom went from shipping such a run-of-the-mill fighter to creating one of the most important games of all time in the space of one sequel is beyond us. But everything about *Street Fighter II* is just... *right*. The cast of characters, spanning a handful of stereotypes and clichés are easy to identify with. The controls, now tuned to actually keep up with quick player input and properly register special move commands, are fluid and responsive. And the music... Main composer Yoko Shimomura may not have been particularly fond of fighters but she absolutely nailed it with the amazing selection of character-specific themes. You only have to look at all the available cover versions, remixes and repurposed theme tunes that litter the Internet to see just how much impact these excellent pieces of music have had.

"SFII's influence on the genre and on gaming cannot be understated"

Even when it got things wrong, *Street Fighter II* still ended up being right. The ability to cancel normal moves into specials was, believe it or not, a bug rather than a design choice – a bug that has shaped an entire genre and one that without which the fighting game as we know it would be really quite different. The concept was later embraced by Capcom, who developed it into a fully-fledged feature with hit counters and everything, though it's hard to believe that just a staple of the genre came about by accident.

» Scoring fights is an arbitrary hangover from older games, though modern fighters still do it

» Beating Bison is no mean feat, especially if the arcade owner has bumped up the difficulty

THE NEW CHALLENGERS

Guile

A US Air Force pilot looking to defeat Bison and avenge his deceased friend and comrade Charlie. While he has only two special moves, they work so well in tandem that he doesn't need any more. And yes, Guile's theme *does* go with everything.

Blanka

Gaming's most notable wildman, Jimmy. Blanka was raised in the jungle after a plane crash (which gave him control over electricity...). The manual describes his fighting style as Capoeira, which is obviously bollocks. He's just crazy.

E. Honda

Throwing yourself headfirst at opponents and slapping them infinite times aren't exactly traditional Sumo techniques, we feel, though Honda has made them his own. A powerful character and a downright terrifying one in the right hands.

Dhalsim

Stretch Armstrong's Indian cousin has unparalleled range due to his mastery of Yoga. He can breathe fire and later teleport too, which aren't things that have been covered in any Yoga DVDs we've seen. Which isn't many. Anyway. Whatever.

Chun-Li

An undercover agent out to avenge her father's death at the hands of M. Bison. Chun-Li is notable as one of the first female competitors to feature in a fighting game. Her nimble style and barrages of kicks made her extremely popular.

Zangief

The Red Cyclone is Russia's finest wrestler and let's be honest here – who wouldn't be intimidated by a guy that practiced his moves on bears? His 360-degree input command throw Spinning Piledriver is his signature move, though his fireballs are equally useful.

Balrog

No, it's not Mike from the original game. Remember? Capcom said so, so it must be true. He's still called M. Bison in the Japanese games, so people have taken to simply referring to him as 'Boxer' to avoid any confusion. His hobbies include punching.

Regardless, its influence both on the genre and on gaming in general cannot be understated. This was the game that developed the idea of direct competition rather than asynchronous back-and-forth score attack. This was the game that cemented the idea of having separate characters with unique move sets as a must-have feature. And this is the game that, for many, represented the first steps into the world of gaming, be it a daunting few plays in a dingy arcade or the thrill of having what seemed like a perfect arcade game in your own home. This was the game that changed *everything*.

WHAT HAPPENED NEXT

The insane popularity of the arcade original spawned myriad home conversions and coin-op updates, some less legitimate than others. The SNES port was, for a long time, the most faithful home conversion and remarkably, it's still to this day Capcom's best-selling game. The first official arcade variant came in the form of *Champion Edition*, letting players use the four boss characters and addressing several issues, while *Hyper Fighting* was Capcom's way of going toe-to-toe with all the board hacks doing the rounds. *Super* later added new four characters with *SSFII Turbo* finally unleashing Super Combos on the world.

THE COMPETITION

The cutthroat arcade scene wasted little time in jumping on *Street Fighter II*'s spectacular success and for several years, the market was awash with fighters looking to pull the rug out from under Capcom's accidental classic. SNK came to the fore during this time, with *Fatal Fury*, *Art Of Fighting*, *Samurai Shodown* and *King Of Fighters* all emerging in the space of a few years with slightly different takes on the one-on-one brawler. Midway's *Mortal Kombat* was another key competitor, digitised graphics and controversial levels of gore helping it to mainstream success. Even home platform exclusives started trying to best official ports of the Capcom game, the likes of Team 17's *Body Blows*, *Eternal Champions* and *Clayfighter* were among those that wanted a slice of this booming genre.

WHAT IT INTRODUCED

- Selectable characters for unprecedented depth and replayability
- The fighting genre's first example of a combo system, albeit by mistake
- The very notion of competitive gaming as an alternative to taking turns and comparing scores

OTHER STREET FIGHTERS

Street Fighter Alpha: Warrior's Dreams

Developed as a prequel series to *Street Fighter II*, the *Alpha* games fleshed out the characters and introduced new ones to develop the franchise's universe. Technical elements like the super meter arrived, as did new features like the Alpha Counter.

Street Fighter Alpha 2

A continuation of the original *Alpha*'s ideas, *Alpha 2* introduced Custom Combos – a system that let players burn super gauge in order to unleash unique strings of moves and specials that might not otherwise combo. Oh, and a handful of new characters too.

Street Fighter Alpha 3

The pinnacle of the sub-series and still one of the greatest fighters ever made. Selectable fighting styles and a wealth of characters offered even greater freedom and depth – hardly surprising, seeing as how this came out after *Street Fighter III*.

Vega

Another name-swap victim, the clawed cage fighter's Japanese name of Balrog actually makes far more sense. His arrogance and grace in battle make him a love-hate character, though most that have faced a skilled Vega player will probably lean towards hate.

M. Bison

The Shadaloo boss and final opponent in *SFII* (Vega in the Japanese version, to tie up the name-swap silliness). Bison's Psycho Power gives him incredible combat potential. If you've not screamed his name in frustration, you didn't grow up in the nineties.

Cammy

Both British secret service agent and former Shadaloo puppet, Cammy's past is somewhat messy, but that's not to say it hasn't made her an exceptional fighter. Simple to use, quick and relatively powerful, she's probably one of the best all-round fighters in the series.

T. Hawk

One of *SF*'s worst cases of racial stereotyping, Native American combatant T. Hawk (or Thunder Hawk to his friends) actually fills a gap in the roster pretty well – a large, heavy-hitting character that doesn't have to rely on grapples. Not that that makes it okay.

Dee Jay

The only character in the series designed by Capcom USA and among the most hated. Coincidence? Another iffy racial stereotype, mainly notable for his 'Maximum' trousers – a word that would read the same vertically on both sides of the screen.

Fei Long

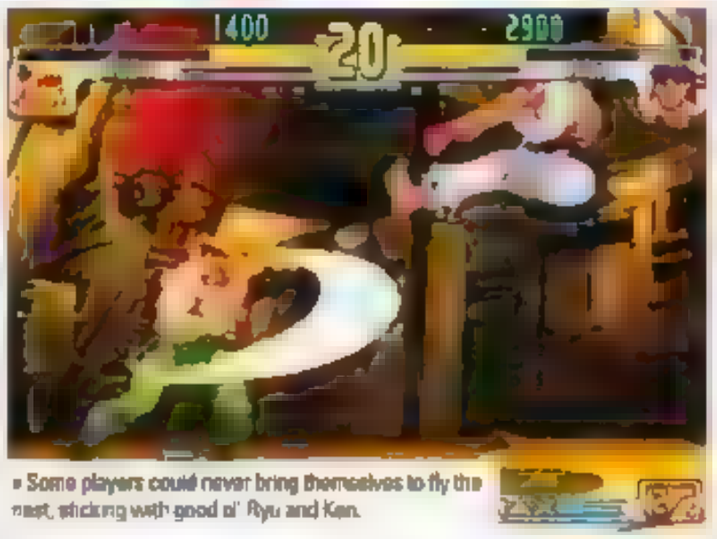
Yeah, okay, so the new challengers were all pretty much dodgy stereotypes. Still, Fei Long's kung fu skills offered a far closer representation of a real martial art than anything presented by the series so far, hence him becoming a fairly popular addition to the roster.

Akuma

The embodiment of evil and the antithesis of Ryu. He's the younger brother of Ryu and Ken's sensei and has gone totally off the rails in his search for ultimate power. A recurring secret boss in the franchise, be on the lookout for his Raging Demon. You might want to jump.

With the world and its dog having developed a bunch of 2D fighters and saturated the market to the point where not even the hardcore could really bring themselves to care, the late Nineties wasn't a good time to be a beat-'em-up fan. Capcom had been plugging away with the *Street Fighter* brand through the popular *Alpha* spin-off franchise but when it came to develop a full sequel, apathy had set in within the fighting community to a dangerous degree. And with 3D fighters starting to really come into their own as well, it seemed like Capcom was fighting a losing battle.

But determined to buck the trend and take back its crown from the genre's new 3D pretenders, Capcom came good with a gorgeous and inventive return to form. A brand new cast (with the exception of returning fighters Ryu and Ken) gave willing players an entire new roster of archetypes to learn and the Parry system – while not exactly embraced at the time of release – would go on to create a moment that will go down in gaming history forever. At the Evo 2003 tournament, the high-level feature seemed like something beyond the grasp of many, but when Daigo parried all 15 hits of Justin Wong's Chun-Li Super Art and responded with a perfect combo to win, the room erupted and the entire world stopped to take notice of fighters once more. There could literally have been no better advert for *3rd Strike*.



• Some players could never bring themselves to fly the nest, sticking with good ol' Ryu and Ken.

"SFIII was determined to take back its crown from the new 3D pretenders"

• Backgrounds and music stack up beautifully with the gorgeous sprites and animation

WHAT IT INTRODUCED

- The Parry System – a risk/reward mechanic for advanced players
- Selectable Super Arts, offering several ways to play each character
- True juggle combos, allowing quick players to land extra hits on airborne opponents

WHAT HAPPENED NEXT

With the 3D boom and the almost entirely new cast causing *III* to be far less of a success story than its predecessor, Capcom pulled its old trick with a pair of updates to the arcade version. *2nd Impact* brought several new characters, the ability to escape throws and the first example of EX special moves, while *3rd Strike* arrived a good two years later, bringing with it yet more new fighters, a refined input system for advanced abilities and balance tweaks that would make it perhaps the greatest 2D fighter ever made. Stellar Dreamcast ports of the first two games (as the *Double Impact* collection) and *3rd Strike* brought the action home, plus it would later appear alongside *Hyper Street Fighter II* on the *Anniversary Collection*, released for PlayStation 2 and Xbox to mark 15 years of the franchise.

THE COMPETITION

Capcom's rivals had really started to establish themselves by this point, although the real threat didn't come from Midway or from SNK – it came from polygons. With PlayStation taking then-revolutionary

THE NEW CHALLENGERS

Makoto
The young Japanese Karate expert isn't for everyone, though her rushdown style makes her *Street Fighter III*'s glass cannon – and your big combo and you've probably won but sit back and defend and it's as good as over.

Q
Street Fighter's mystery man, little is known about what Q actually is. Favouring brute force over speed and lengthy combos, he's a fierce opponent in the right hands, not least because his taunt ups his defence by a lot.

Remy
France's answer to Guile is far more delicate and elegant than his military analog, though he's not much less dangerous. His extra special moves also make him a somewhat more interesting character to learn.

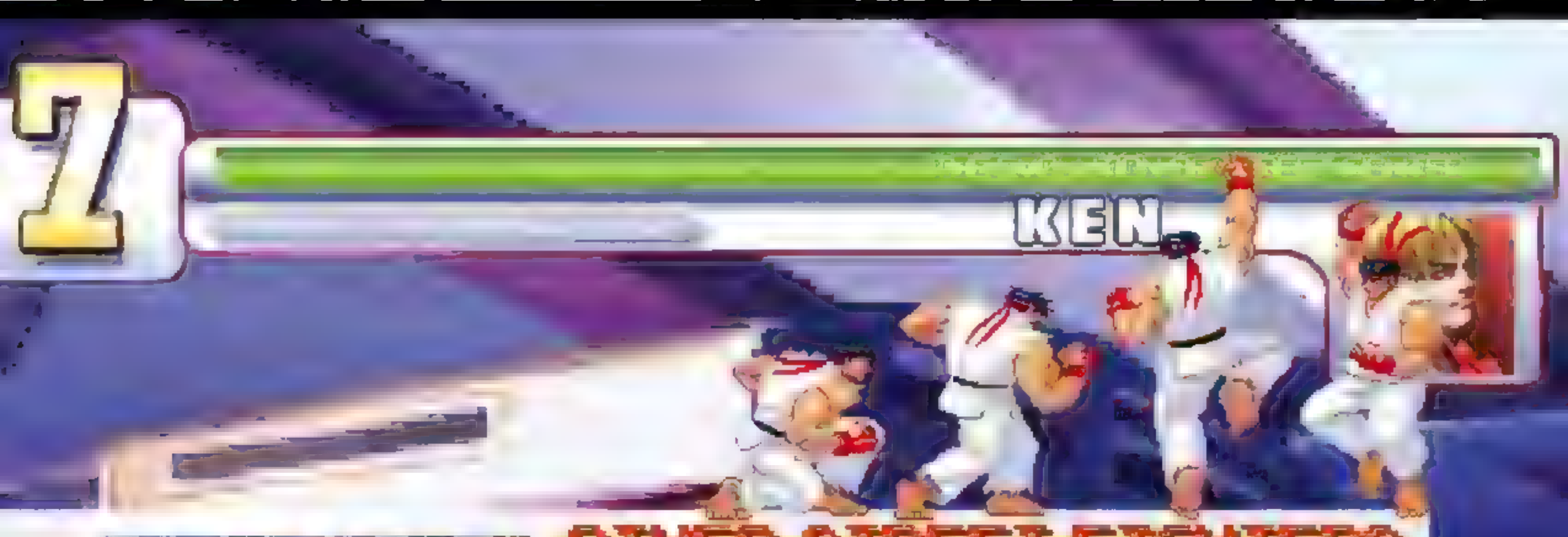
Twelve
The goopy experiment that is Twelve is probably the worst character in *SFIII*, though many have learned him for just that reason – nobody expects his bizarre fighting style, and with powers of flight and invisibility he can be tricky to catch.

Alex
Another brawler, albeit one with a few more tricks up his sleeve than usual. Originally intended as a replacement for *SFII* frontmen Ryu and Ken, his play-style didn't help him fit this role, nor did the fact that they both came back.

Dudley
A gentleman boxer is the perfect counterpoint to Balrog's bullish approach to fisticuffs – Dudley's butler is always on hand and the pugilist can even throw roses with his taunt, a makeshift projectile perfect for carving an opening.

Elena
If you thought Chun-Li was all legs, you ain't seen nothing yet. Elena's stunning animation remains one of the highlights of *SFIII*, those stupidly long legs flailing around the screen constantly and many of her specials linking together into one fluid combo.

Ibuki
The original has generic ninja Geki but *SFIII* gets the far more interesting Ibuki, another fragile character that excels in rushdown play and in confusing the opponent into making mistakes. Her taunt reverses the opponent's controls briefly, if successfu



OTHER STREET FIGHTERS

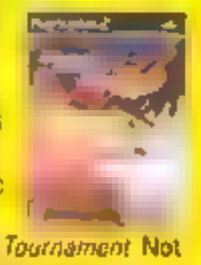
Street Fighter EX

With the 3D revolution in full swing Capcom didn't want to be too late to the party it helped start. It did, however, turn up horrifically dressed and half cut. *Street Fighter* it seemed, was not cut out for life in 3D.

Street Fighter EX2

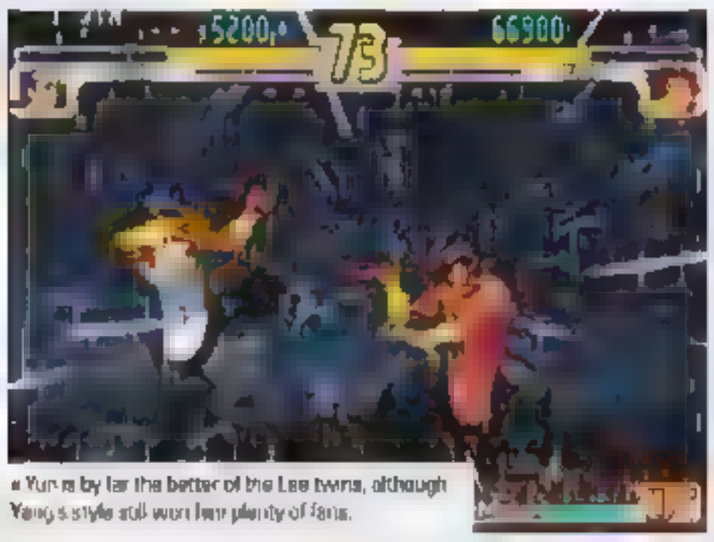
But that didn't stop a sequel from surfacing, improving matters slightly but still not to an extent where the game has any worth above 20 versions of the game. A side mode did pave the way for *SFIV*'s character specific Trials, though.

Street Fighter EX3



A PlayStation 2 launch title but not one of the better ones. The same dodgy 3D visuals returned, joined this time by a tag mechanic similar to the *Versus* series and *Tekken Tag Tournament*. Not one of the series' high points.

▪ In truth, Sean's move pool isn't dreadful. It's the lack of priority really hurts him.



▪ Yun is by far the better of the Lee twins, although Yang's style still won him plenty of fans.

strides in 3D home gaming and arcade boards growing more powerful at a shocking rate. 3D fighting games like *Virtua Fighter*, *Tekken* and *Soul Blade* proved far more interesting and novel to gamers than the sprite based visuals they had been fighting with for a decade. Despite dwindling interest in traditional 2D fighters, the push for quality resulted in some of history's finest fighters – *3rd Strike* is without doubt Capcom's best while SNK's answer *Garou: Mark Of The Wolves*, is right up there as well. What, no love for *Mortal Kombat*? No. Move along.

▪ Letting Q taunt isn't the best idea – even with Urien setting up Aegis Reflectors everywhere, the robotic freak is still a monster after a taunt or two.

"The real threat didn't come from Midway or SNK, it came from polygons"

Necro

SFIII's version of Blanka, if you will, replete with an electrocution attack and a screen-spanning spin albeit horizontally rather than vertically. He's not much of a threat, but you can't help but feel for a character who has to apologise every time he's late.

Oro

Two arms? Sod that. Oro can beat you with just one. Among the franchise's oddest fighters, this old guy's unconventional style won him few fans at launch, but the fact that he's trained by one of the JK's best players, Zak Bennett, shows there's something there.

Sean

If you wake up in a fighting game one day and your Super Art is a one-hit fireball it shouldn't take too long to work out that you're a joke character. Sean is *SFIII*'s Dan, then no amount of training under that filthy scrub Ken is going to do anyone any good, after all.

Yun

Gene-Jin is Yun. His third Super Art lets him stylishly link almost any of his specials into one destructive combo with the right execution, making him a perfect choice for high level players. Doing one damage his hat spin taunt is perfect for trolling.

Yang

The runt of the litter. Yang started life as a palette swap of Yun but later got given his own moves and abilities. Which, sadly, made him worse. He's a decent fighter though his custom combo Super Art is nothing compared to Genei Jin.

Gill

The game's every-bit-as-cheap, as-expected boss. Gill can either use his super gauge to rain fire down on the screen for insane damage (even if blocked) or conserve it to resurrect when defeated. And if that's not cheap, we don't know what is.

Urien

A rushdown charge character is a rare beast indeed, and Urien fills the role brilliantly. He could probably do with wearing more than just a pair of pants when going into a fight, though his crazy combo potential makes up for his inability to dress himself.

Hugo

He's number one, apparently. *SFIII*'s Zangief equivalent as no less than three command grabs (and two more in his Super Arts!) but he has more ways to close distance than the Russian ever did. Don't expect that to make him easy to play though.

STREET FIGHTER IV

A LEGEND IS REBORN

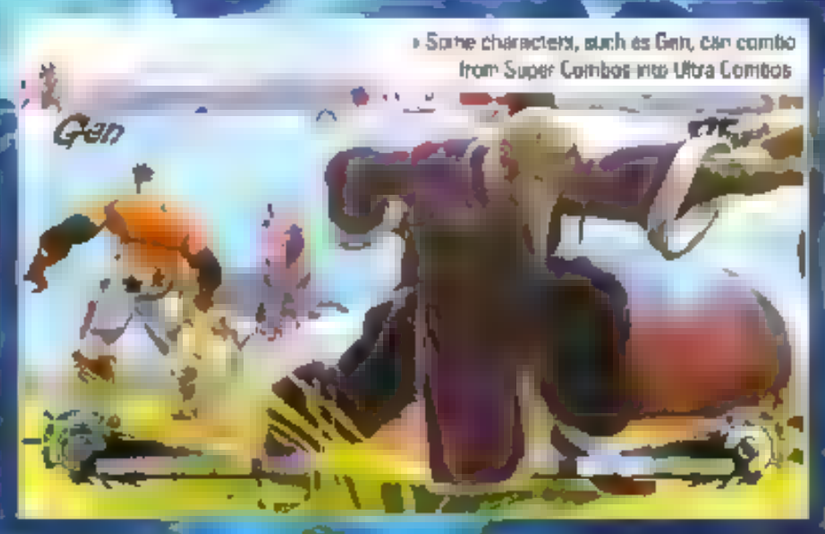
The eight years between *Street Fighter EX3* and *IV* represented the longest the series had ever gone without a new game, largely because many senior Capcom figures weren't exactly behind the project. But relatively unknown Capcom producer Yoshinori Ono pushed relentlessly for a new *Street Fighter* game despite opposition from his peers and superiors.

After the roaring success of the HD remake of *Super Street Fighter II*, though, the Capcom suits were left little choice but to sit up and pay attention to Ono, who was put in charge of bringing back *Street Fighter* properly. The thinking behind the belated comeback was simple – set between *SFII* and *SFIII*, *Street Fighter IV* would bring back the entire cast of world warriors from the series' most popular game while mirroring its accessibility.

SFIV was designed to be instantly familiar and that proved to be one of the core strengths of this late return. But as well as ensuring a low entry barrier and a balanced playing field, Capcom also did a great job of making *IV* a multi-tiered affair that could be employed by players of all skill levels. Take the Focus Attack, for example. Newcomers could use it to stun hesitant opponents for a free combo, intermediate players could use its armour properties to absorb single blows in a similar way to *SFIII*'s Parry (using a dash to cancel recovery or activation of the actual attack) while pros could use it to cancel attacks, leading to some of the game's flashiest combos. The comeback mechanic, Ultra Combos, offered similar depth – many newcomers could throw out hopeful Ultras, but most characters could combo into their ultimate attacks with the right set-up. *Street Fighter* was back on top.

WHAT HAPPENED NEXT

With the current hardware generation poised to overflow with me-too shooters, Capcom's timing in bringing back *Street Fighter* was absolutely perfect. Long-dormant fighting fans rose from their slumber to seek out arcade units, with the improved home version bringing competitive fighting back to the masses just like *SFII* had done 17 years before. The *Super* version added new characters and selectable Ultra Combos, and *Arcade Edition* bringing a further four to bring it in line with the latest coin-op version.



» Some characters, such as Gen, can combo from Super Combos into Ultra Combos

THE NEW CHALLENGERS

Abel
French amnesiac Abel remembers nothing of his past... except for massively complicated close-combat moves. It's likely that he was a discarded prototype in the program that led to the creation of *SFIV*'s boss, Seth.

C. Viper
Many claim she looks more like an SNK character than a Capcom one but Viper fits into the *SFIV* cast just fine. Her combat suit lets her burn and electrocute with jump jets in her heels making her one of two with a Super Jump.

Cody
Final Fight veteran Cody makes his return here, after debuting in the *Alpha* sub-series. He's still rocking the convict look and chucks stones around like a child, plus he's apparently even left a knife on the floor in every place he might go.

Dan
The series' leading joke character makes his main series debut, having been formally introduced as a parody of the way SNK were thought to be ripping off Capcom's fighters. And the strangest part about him? He's not actually rubbish.

El Fuerte
It might have a couple of wrestlers already but Fuerte's spindly form, crazy speed and Lucha Libre skills set him apart from the stocky grapplers. He's an annoyance as much as a usable character, mostly because he never shuts up.

Evil Ryu
What would happen if Ryu's search for power took him down a darker path? He'd get a few new moves and be better at fighting, apparently. Makes perfect sense. Another *Alpha* callback, Evil Ryu entered the fray in *Arcade Edition*.

Gouken
"You must defeat Sheng Long to stand a chance", reads Ryu's original *SFII* victory quote. Well, now's your chance. Gouken *is* Sheng Long, Ryu and Ken's former master making his first playable appearance here. Not just an April Fool's joke then.

Guy
Another *Final Fight* star, leaving Haggar as the only absentee. Still, he's busy fighting Galactus in *Marvel Vs Capcom 3*. Guy's American ninja awesome-looking combos won him many fans – we like him for his 'Profound sadness' win quote.

THE FUTURE

The success of *Street Fighter IV* meant that *Street Fighter V* was announced in 2014. Unfortunately for Capcom, the eventual 2016 release didn't go as smoothly as it was hoping for, due to the game possibly being rushed for that year's Evo event. The original release was barebones, lacking a story mode and many other gameplay elements. As a result, it launched to mixed reviews.

Capcom doggedly stuck to its guns, adding the missing elements and introducing a selection of new characters for each year the game has been on sale, bringing back fan favourites likes Birdie, Nash and R. Mika, and introducing brand-new heroes, including *Final Fight*'s Abigail. It had a bumpy start but the game has now built up a strong fanbase.

WHAT IT INTRODUCED

- The Focus Attack, a chargeable crumple that absorbs blows and can be used to cancel attacks
- Full online integration, turning the whole world into your very own arcade
- Trials mode, an inventive way of practically teaching combos and skills

OTHER STREET FIGHTERS

Marvel Super Heroes Vs Street Fighter

Pitting Marvel's finest nonsense warriors against a host of Capcom's martial artists may not have seemed fair. But by turning everything up to 11, Capcom managed to make it a frenetic and exciting crossover.

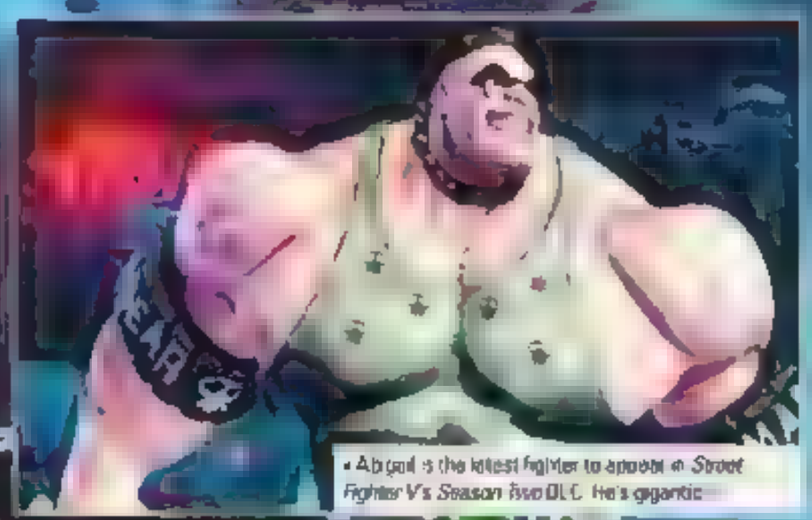
Capcom Vs SNK 2: Mark Of The Millennium 2001

Not strictly a *Street Fighter* game perhaps, but Capcom's representatives in *CVS2* came predominantly from its leading fighting brand. Of all of the olde crossover fighters, this is easily the one that still holds up best.

Street Fighter X Tekken

While hardly retro fun on account of having come out this year, *SFXT* gave a mammoth cast of *Street Fighter* stars the chance to beat down 3D fighting's finest. And they did – though the *SF* guys and gals work way better in a 2D game.

> "Capcom's timing in bringing back Street Fighter was perfect"



Abigail is the latest fighter to appear in *Street Fighter V*'s Season Two DLC. He's gigantic.

Hakan

What *is* Hakan? He's red, has blue egg cartons on his head and fights by smearing himself on or then throwing people around.

Juri

The hot-headed Korean S.I.N. agent was reportedly added in at the request of Capcom Korea, but her origin doesn't alter that she's an awesome character both to watch and play. She's also *Street Fighter*'s only Taekwondo practitioner to date.

Rose

The *Alpha* games gave us some great characters, with many of the best returning in *IV* and its variants. She was decent in vanilla *IV* but really came into her own in *Super* with her second Ultra Combo, Soul Satellite.

Rufus

The fat guy hates Ken, so we really identify with him. Like *Tekken*'s Bob, his size belies his speed and with dive kicks and screen-spanning assaults, aplenty, he's a force to be reckoned with. His moves flow so beautifully, he's a joy to play.

Sakura

Ryu's protege and another *Alpha* alumnus, Sakura returns in *IV* to offer players her own Hurricane Kicks, Dragon Punches and fireballs. Not the strongest, but tweaks to her abilities in *Super* made her more viable.

Seth

Named after former Capcom community manager and fighting game champ Seth Killian, this blue monster is *IV*'s final boss. And like Gill before him, he's supremely cheap. Not so much when you play *as* him, rather than against him, mind.

Oni

Evil Akuma probably wouldn't have made much sense, so Capcom instead settled on Oni. That's what he is, though – a blazing, even-more-powerful version of the famous hidden boss. He even has a version of the Raging Demon that can be performed in the air.

THE WORLD WARRIORS

THE EVOLUTION OF STREET FIGHTER

IN THE KNOW

- **Publisher:** Taito
- **Developer:** In-house
- **Released:** 1987
- **Systems:** Arcade, various
- **Genre:** Arcade shooter

Operation Wolf

We take a definitive look back at Taito's classic arcade blaster and unravel its brilliance by speaking to the individuals who know the game best

The words *'Operation Wolf'* will likely conjure up one image in your memory: summer holidays spent down your local arcade with a pocketful of lives and a beaming smile as you blow away enemies like candles on a birthday cake. Its action-packed cabinet art, showing a Green Beret firing a machine gun while carrying a hostage, coupled with a realistic-looking Uzi with which to mow down virtual militia, was enough to make even the most ardent pacifist slot a coin down its throat.

Taito's *Operation Wolf* wasn't the first gun game to appear on the scene, but with a loud echo of the *Rambo* films emanating from the coin-op, it quickly became one of the most popular, able to turn a small child into a gun-toting hero, and, because the enemies all looked like *GI Joe* characters, parents didn't bat an eyelid.

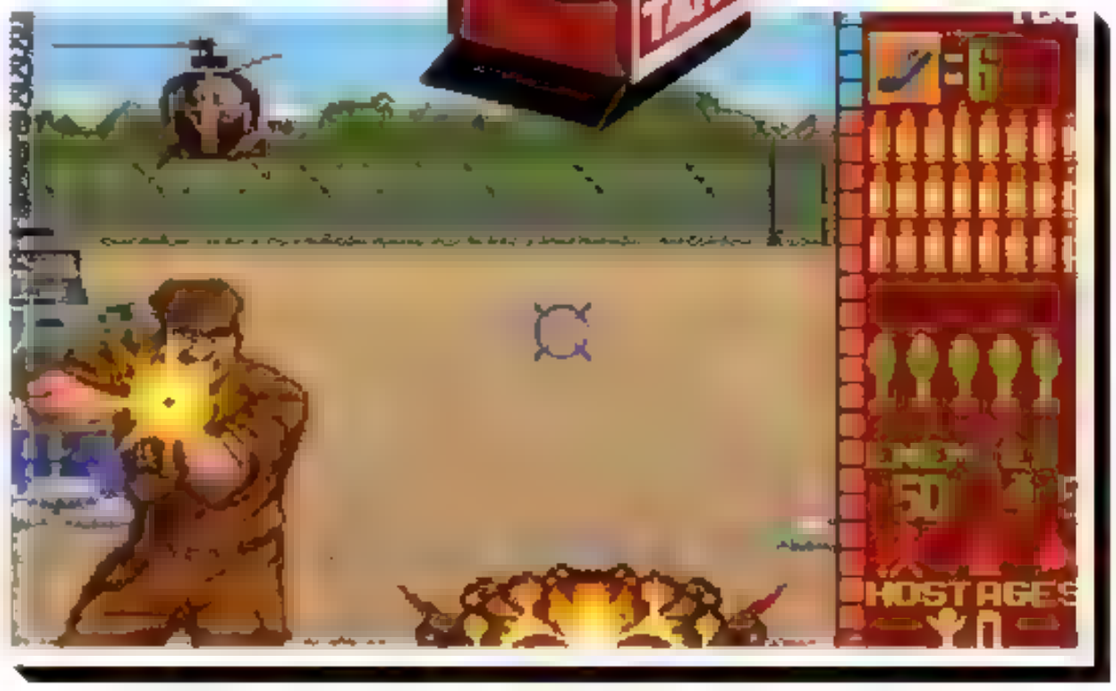
While light gun games had appeared on the scene as far back as the late Thirties, *Operation Wolf* was really the first to have a story tying together its levels: your mission is to locate and rescue five hostages and then help them escape to safety. The early stages see Roy Adams trying to find the concentration camp where the hostages are being kept, and he does this by interrogating an enemy officer. Then, after a brief detour to save a village, Roy arrives at the camp, frees the prisoners and must provide covering fire as they run into the back of a C-123 military transport aircraft making its way down a runway.

One interesting aspect of *Operation Wolf* is the fact that your efforts in the field affect the outcome. At the end of the game, the President will either be singing your praises or ripping shreds off you, depending on how many of the hostages you rescue, making *Operation Wolf*, as well as Taito's *Bubble Bobble* (1986) and *Arkanoid* (1986), one of the earliest arcade games to feature alternate endings. Weirdly, and contrary to this thinking, in the original Japanese version, the player is given the choice of which order to tackle the missions in, an option that appears in the Japan-only PC-Engine port.

The enemies that Roy faces include a variety of different soldiers and vehicles, and thanks to the fact that a stage only ends once a set number are destroyed, the action maintains a manic pace. But it isn't completely one-note, as the player must conserve ammo and also be careful to avoid shooting civilians that run into the fray. The latter feature has since become a staple, if annoying, part of gun game gameplay.

Since its release there has existed a small shadow of doubt as to whether *Operation Wolf* is actually a light gun game or not. As the gun is bolted to the arcade cabinet, many believe the game's controls actually work by having the crosshair on its screen steered by the gun mechanically, as opposed to light sensor technology. Well, the truth is that *Operation Wolf*'s Uzis did utilise the technology, but, as the light sensors were unreliable, manufacturers decided to rethink how the crosshair was controlled. They opted to use mechanical controllers with a potentiometer that would track the movement of the gun and relay the information to the screen. *Operation Thunderbolt*, *Operation Wolf*'s sequel, utilised this change.

Such was the popularity of *Operation Wolf*, it was ported to pretty much every platform in existence, with impressive ports by Ocean found on the Amiga, ST and various 8-bit micros and TurboGrafx-16. Master System and NES conversions by Taito. More recently, the NES version of the game was made available to download on Nintendo's Virtual Console last year, and an arcade perfect-ish port was released as part of *Taito Legends*, alongside Taito's *Space Gun*. Sadly, neither game was given light gun support. ✱



THE EXPERT

We caught up with Operation Wolf MAME world champion Rudy Chavez and sweated out the intel on how he managed to mow down 16,316,700 worth of enemy militia... without even using a gun!

PROFILE

- **» Name:** Rudy Chavez
- **» Age:** 33
- **» Date of the [illegible]**
- **» Current World Records:**

Superman (coin-op)
1,914,900 points
Mercs (coin-op)
999,990 points
Alien 3: The Gun (coin-op)
17,630,000 points
Bionic Commando (MAME)
2,251,090 points
Chase HQ (MAME)
11,071,500 points

■ So do you remember the very first time that you saw *Operation Wolf*? What sort of impact did it make on you at the time?

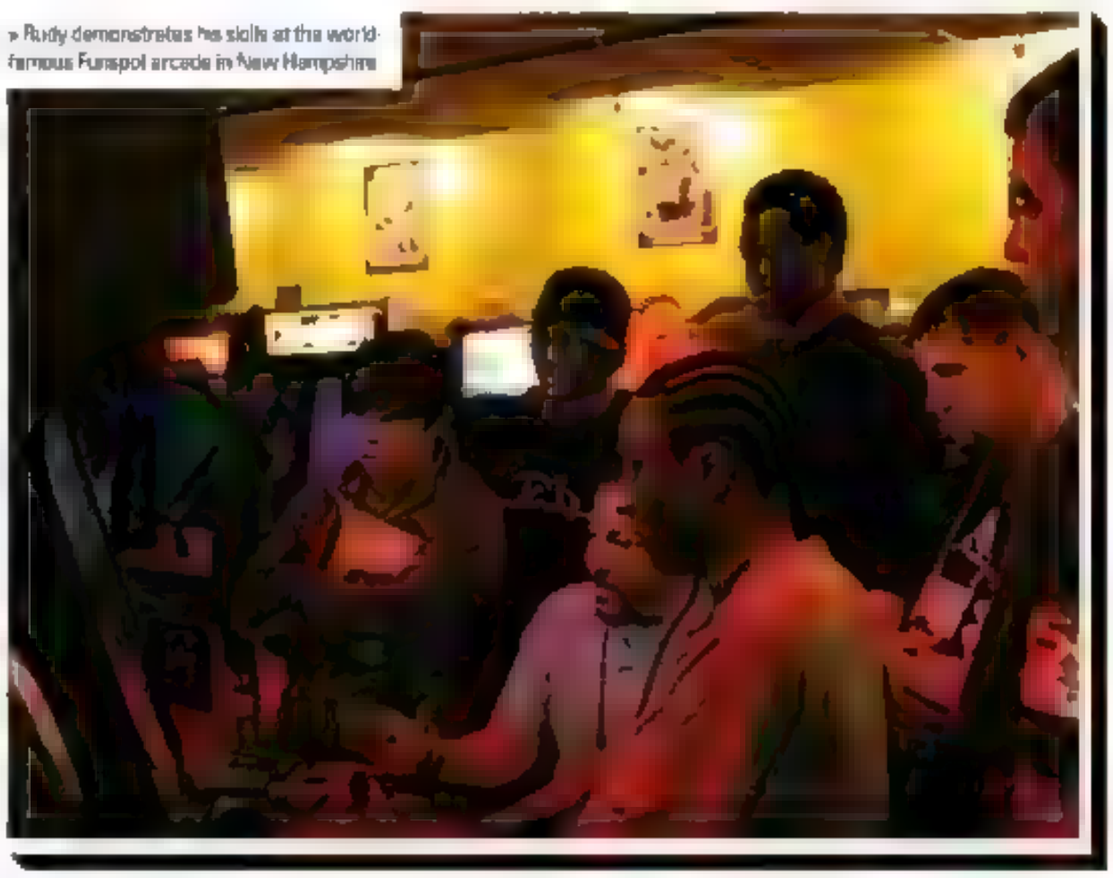
Yes. When I was a kid I went alone to 7th and State of downtown LA and saw from a distance this odd-looking arcade that I thought was a carnival shooting game. I was amazed at the realism of the gun, with the epic intro graphics, so I put in a quarter, hit the start button and exploded with excitement with the shaking recoil feel of the gun. I felt like Rambo firing on those guerrilla soldiers and learnt right away how to use the rocket bombs correctly.

■ Do you remember the first time you finished the game?

I kept trying to finish the game but found the Airport Getaway area just too hard. So I stopped playing for a few months because of the frustration, and only stood watching other gamers play until I saw this one person mowing down the enemies quickly and tactically. It was so amazing that he even looped it a few times. I learnt his tactical secrets that helped me to keep looping *Operation Wolf* back then. I now utilise my skills on the MAME version, but I also play other positional fixed gun games like *Alien 3: The Gun*, which I also hold the world record on.

■ Can you tell us a little about your impressive high score on the game and what it feels like to be the Twin Galaxies MAME World Champion?

I was given the title World Champion officially for a big reason, and that is I try to go further than what is already necessary to set a world record. I raise the level of difficulty all the way up and decimate it from start to end.



» Rudy demonstrates his skills at the world-famous Funspot arcade in New Hampshire

with no loss of life. MAME supports many types of control devices. The three basic classes of controllers are keyboard, mouse and joystick, and you may be wondering, 'Is it easier to use a light gun?'

■ So what are the main advantages and disadvantages between using a gamepad and light gun when you are playing the game?

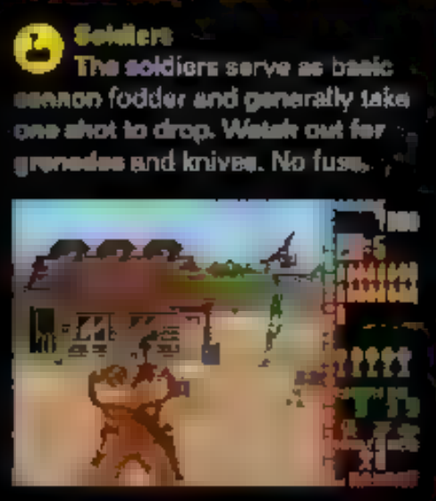
The gamepad gives a positioning crosshair that helps you fire at enemies accurately, but moving it is time-consuming and making a rapid decision during an unexpected heavy firefight can be tricky.

The light gun offers true aiming accuracy and gives fast response to any direction, but you need to fire the gun most of the time to know your aiming direction. Doing this causes ammo to decrease rapidly.

The mouse gives a positioning crosshair with smooth scrolling and

KNOW YOUR ENEMY

Listen up, maggots! To ensure you don't come home in a body bag, you'll need to know what you're up against.



Soldiers
The soldiers serve as basic cannon fodder and generally take one shot to drop. Watch out for grenades and knives. No fuss.

Armoured Truck
Being that these are made of steel and have a top-mounted turret, they are tricky enemies to destroy. Take them out quickly.

Helicopter
Like the truck, these give you a few moments to spot them and take them down. There are two choppers in the game.

Boat
The boats only make an appearance in the jungle stage and are the easiest vehicles to take out. Aim for the gunner.

Duke Nukem
Okay, it's not actually the Duke, but you have to agree the similarity is striking. Aim for the head and put him down quickly.

speed but the durability of the mouse may fail during long gameplay of input stress at a greater rate An example is rapidly clicking and grip pressure Also it's an absolute hand workout once you are two hours into the game

■ As well as the obvious, what are the main differences between the MAME and coin-op versions of *Operation Wolf*?
The real arcade [machine] of *Operation Wolf* is far superior for many reasons The cabinet has a mounted metal Uzi gun with force feedback and mechanical vibration to mimic the feel of recoil every time you pull and hold down the trigger MAME cannot replace the real deal, it can emulate any arcade game but not the actual feel of it

■ Can you tell us a little more about your *Operation Wolf* world record? How did you manage to reach such an impressive score?
My world record *Operation Wolf* MAME score of 16,316,700 is one of my best long-enduring challenges I've accomplished It took around four hours to complete and I had to continually move my mouse rapidly firing and blasting the enemies constantly, since this was set on the hardest difficulty setting. It was hellish whenever I looped the game, and the only rest I had was when a stage was completed or the last mission was finished I was determined to go the farthest I had ever done and when I did it I was so thrilled.

■ How did you manage to maintain concentration on the game for so long and will you ever attempt to beat your record?
You know, the funny thing is on the early tries I broke my mouse during the battles and ended with around 5 million points. One day hope to be sponsored to go to Funspot again to beat my own MAME world record on the actual *Operation Wolf*

Knifemen
The knifemen only crop up during the last two stages but will ignore you and kill the hostages. Take them out quickly or the mission will be in vain.

RUDY'S SURVIVAL GUIDE

The expert Operation Wolf player reveals his personal tips and strategy to mastering the game and racking up those high scores

1 ■ MUNITIONS
Every commando knows that running out of ammo means leaving out of the sc reserve ammo by not auto-firing during battle and save your rocket bom b[illegible] seconds s[illegible] destroying the light armoured vehicles, gunboats and MiG fighters

2 ■ STATUS BAR
It s important to pay close attention to your health munitions and number of enemies you have to kill This way you know what to expect if any ambush occurs Remember that any hostage or villager you kill will deplete one health cube

3 ■ ITEMS
The jungles surrounding the prison camp are full of wild things but luckily *Operation Wolf* has a lot of wild scattered items for you to find Shoot the coconuts and animals to reveal items and bonuses. Sometimes, though items will just randomly appear

4 ■ MILITARY TERRAIN STRATEGY
In the Communication Camp stage, try to conserve as much ammo as you can On Jungle Camp always aim for gunboats and paratroopers first On the village stage try not to waste any rockets, but in the Munitions Base stage feel free to use rockets at will On the Concentration Camp stage try not to use any rockets, and finally, on the Airport stage, try to save all the hostages before using rockets

5 ■ BRUTE FORCE ROCKET BOMBS
The best tactic to mow down enemies quickly is to use the rockets when they group together Kill two, three, possibly five birds with one rocket grenade, as it were. Always keep yourself safe by having at least two rockets for life-threatening moments

SEQUEL PIGGY

We take a look at the follow-up missions of Taito's popular war franchise

Operation Thunderbolt
Released: 1988

Operation Thunderbolt is a fine follow-up that remains true to the elements that made the original game such a massive hit. This time Roy is joined by fellow Green Beret Hardy Jones, and both men are tasked with saving American hostages from a hijacked plane. Tweaks to the gameplay include the action now scrolling into the screen as well as horizontally, plenty more hostages to rescue, and the odd first-person vehicle section. Perhaps owing to the fact that the game could be played in co-op, *Thunderbolt* is a more challenging game than the original, a though the benefit of being able to continue from where you fail – except during the final boss fight – does balance things out a shade.

Operation Wolf 3
Released: 1994

The third game feels like an *Operation Wolf* game in name only, and given how bad the English in the game is – our favourite quote is "The nuclear missile is fire Down with it before time limit" – it's a wonder Taito even managed to get that right. The game is clearly from the dreaded post-*Lethal Enforcers* epoch of gun games, and drops the timeless sprites in favour of digitised actors and dull gameplay With no Roy or Hardy to take charge – instead we get a Clive Owen lookalike and a woman who looks like Daryl Hannah in *Blade Runner* – and an army of enemies dressed like they're at a rave, this game almost takes a combat knife to the throat of the series.

Operation Tiger
Released: 1999

In 1999 Taito released its final *Operation Wolf* title, *Operation Tiger*. It once again changed the look of the franchise, going all *Time Crisis* and *Virtua Cop* in opting for graphics made up of polygons. Astute readers will have probably already twigged that *Operation Wolf* is one of the few gun game franchises to have ticked every box in the visual evolution of the genre. The plot is set in good ol' 199X where Nation X has been taking over neighbouring oil-producing nations. You join the mission at the point where it has proved an abject failure and are tasked with trying to rescue your fallen comrades and help them escape

THE MACHINE

We have a brief chat with Jamma+'s Chris Nightingale about his recently restored Operation Wolf cabinet. If only it was ours...

"I purchased the Electrocoin *Operation Wolf* cabinet in a semi-working state off eBay from a guy who had it in his home for the past five years. It was in reasonable condition bar the usual scuffs and cigarette burns you find on any arcade game of that age. The restoration process took a couple of months and mainly consisted of cosmetic restoration as well as fixing a few technical issues. The hardest aspect of the restoration was the monitor because it wasn't something that I could actually repair myself."

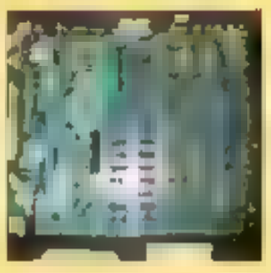
TAITO

Taito was formed in 1953 under the name Taito Trading Company. The company released numerous arcade hits during the Seventies, Eighties and Nineties, including *Bubble Bobble*, *Arkanoid* and *Space Invaders*. It is now owned by Square Enix.

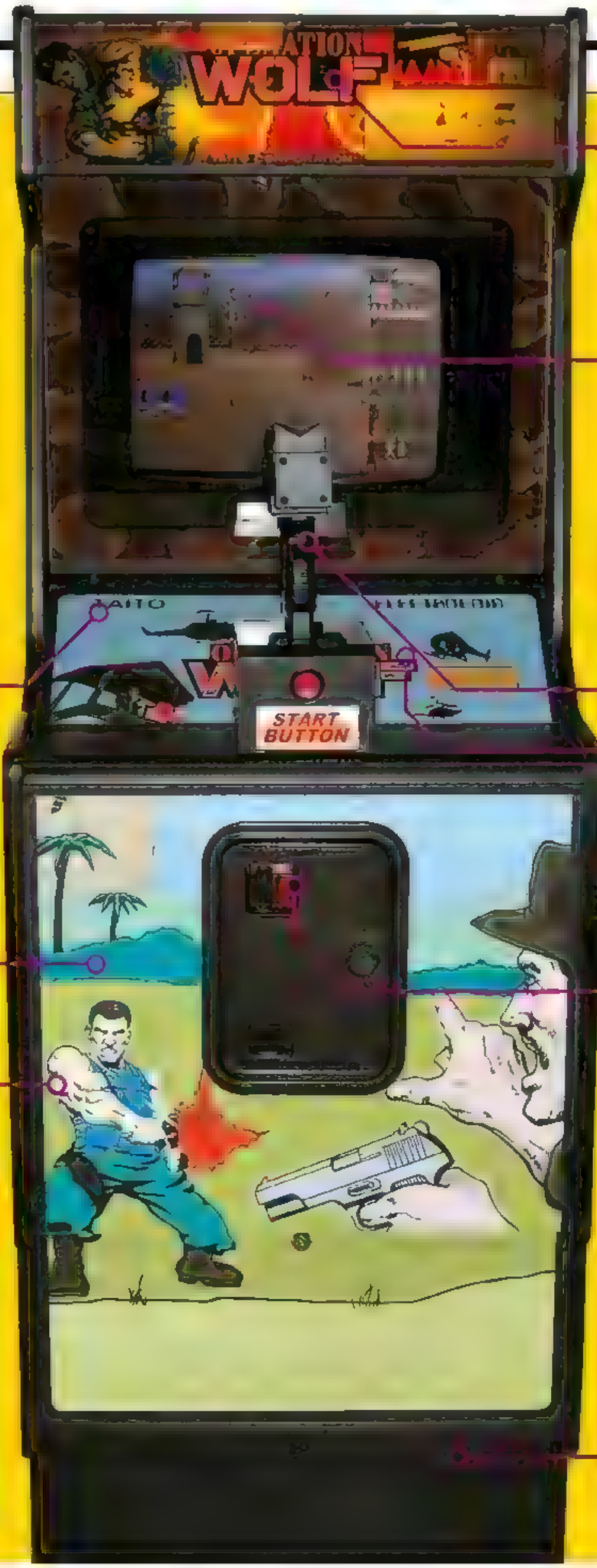
ARTWORK

"As with all these old machines, the artwork did have the odd battle scar due to years of service, so I decided to restore it to its former glory. I decided to recreate the artwork from scratch myself and apply it directly over the original. I then recreated it in Paint Shop Pro, which was a fairly time-intensive process. The results came out really well."

PCB



At the heart of the machine is the game software, which runs from a PCB that has connections to all the controls, the monitor and the speakers. Again, these are the sorts of electronics that you don't really want to be fiddling with unless you know what you are doing. I was lucky in that the board worked perfectly, but I've still invested in a spare board just in case."



MARQUEE

Like many arcade marquees, *Operation Wolf*'s is designed to both attract punters – it's backlit – and show them how to play the game, with this marquee clearly showing who you need to avoid shooting and your weapons.

MONITOR

"The main technical problem was that the gun didn't register any hits on the screen – a common fault for a number of reasons. The particular fault was due to the monitor and required a reasonable amount of work to fix and was beyond my expertise. Luckily, Craig at Station (www.gi1.co.uk) was able to help me."

THE GUN

The most important feature of the game is the gun, which is modelled on the IMI Mini Uzi 9mm. As this is something that is handled all the time, it had a number of dents and scratches and a lot of surface rust. I stripped down what I could and removed all the existing paint, primed it and then I finished it off with a re-spray. I also cleaned up the start button and the lens within the gun, and reproduced the 'Start Button' label. I've also purchased some spare guns and restored those as well, just in case something ever goes wrong.

ELECTROCOIN

Electrocoin was responsible for manufacturing *Operation Wolf* throughout the UK and has been in business for over 30 years. It is still handling sales for Taito, with its latest release being 2007's *Chase HQ 2*.

COIN MECH

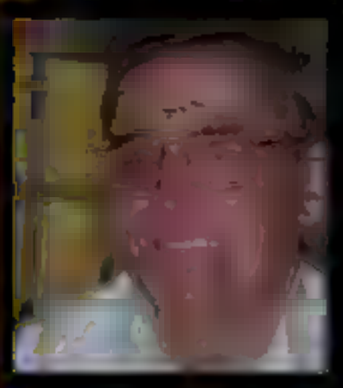
"Although the cabinet had a coin mechanism (Coin Controls C220) that accepted 10p, 20p, 50p and £1 coins, the previous owner didn't bother using it. I decided to keep the coin mechanism, but it was out of date, programmed with the old 50p coin and needed updating to the current one. I was able to get one from Swallow Amusement Machines (www.coin.demon.co.uk)."

SIDE ART

Chris hasn't recreated the original side art, so here's a picture of it. It depicts the lone wolf gunning down unseen enemies with a POW slung over his shoulder. Powerful and effective.

DEVELOPER Q&A

We speak to Colin Porch and David Blake, who worked on the Commodore 64 port of the game for Ocean software.

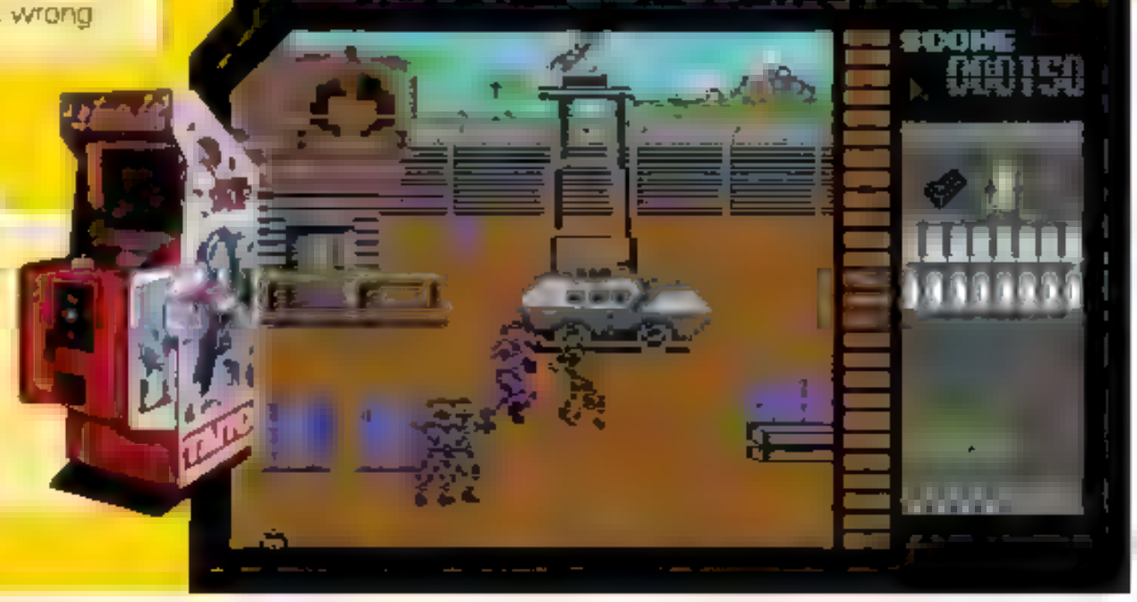


So, how did you get the gig?
CP: I was an in-house programmer for Ocean, as was David Blake. We were shown the arcade version and asked if we could convert it to the C64. I could see all sorts of technical problems, but the answer, as usual, was: "We'll give it our best shot!"

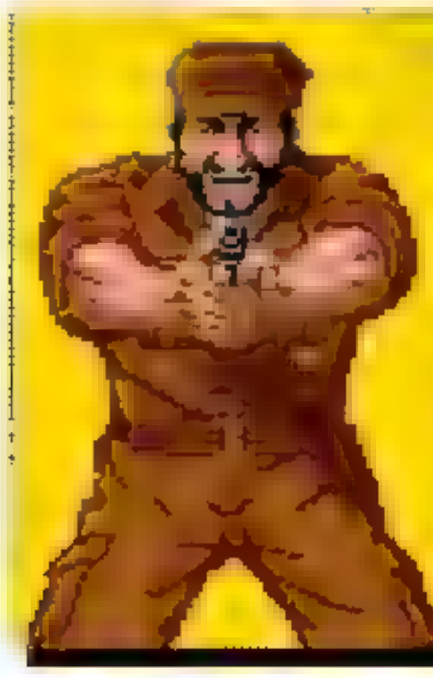
Did you receive any support from the original developer?
CP: Not that I recall, apart from having access to the arcade machine. We certainly didn't get any source code.
DB: None. Apart from them supplying the arcade board, and to be honest I'm not sure they even did that. We had a room full of boards hooked up to monitors. To my knowledge, none of us ever had any technical support from the original developer. We didn't need any. All we needed was access to the original game. I would say it took us 4-5 months to complete the conversion. By the time we had finished I was an expert!

Which 8-bit version do you feel was the best?
CP: I'm not sure that I saw the others in any great detail, but all were pretty good if I remember. Certainly I did not think that a better job could have been done on the C64.
DB: To be honest, I can't remember. But I think ours was the most faithful, and many C64 gamers appreciated the unique technical qualities of the game. I can't think of another scrolling C64 game with a vertical split. No. This never happened to my knowledge.

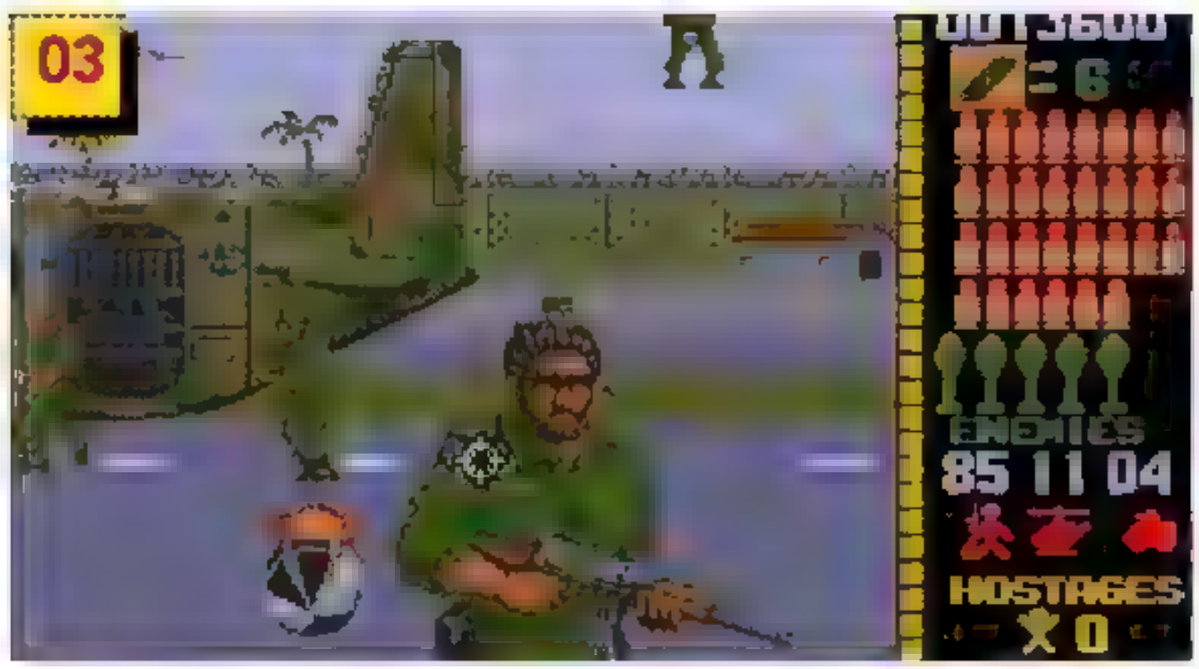
How long did the conversion take and how many of you worked on it?
CP: On the programming side, just myself and David. But there were lots of others involved in graphics, sound effects and music. I'm not sure that I can remember them all... Steve Wahid and Keith Tinman, I seem to recall, but I'm sure that there were others. Such projects usually took a few months, and deadlines, when eventually given, had to be stuck to! Lots of midnight oil spent!
DB: As I was the new boy at Ocean, and very young even by their standards (16), they thought it would

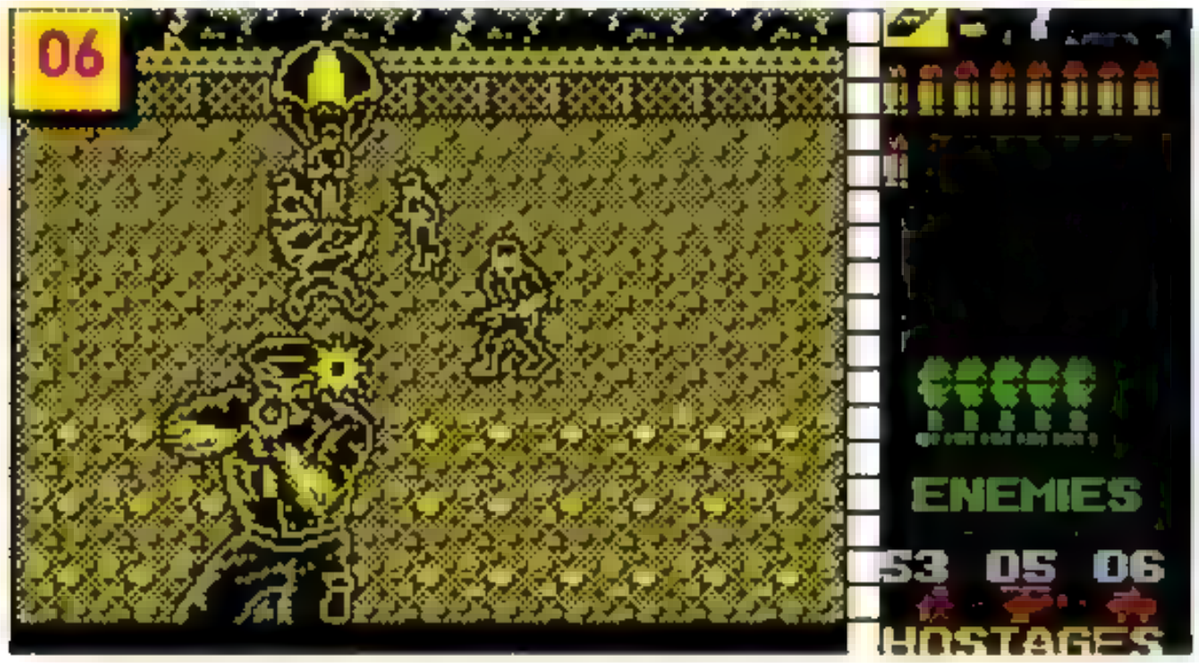


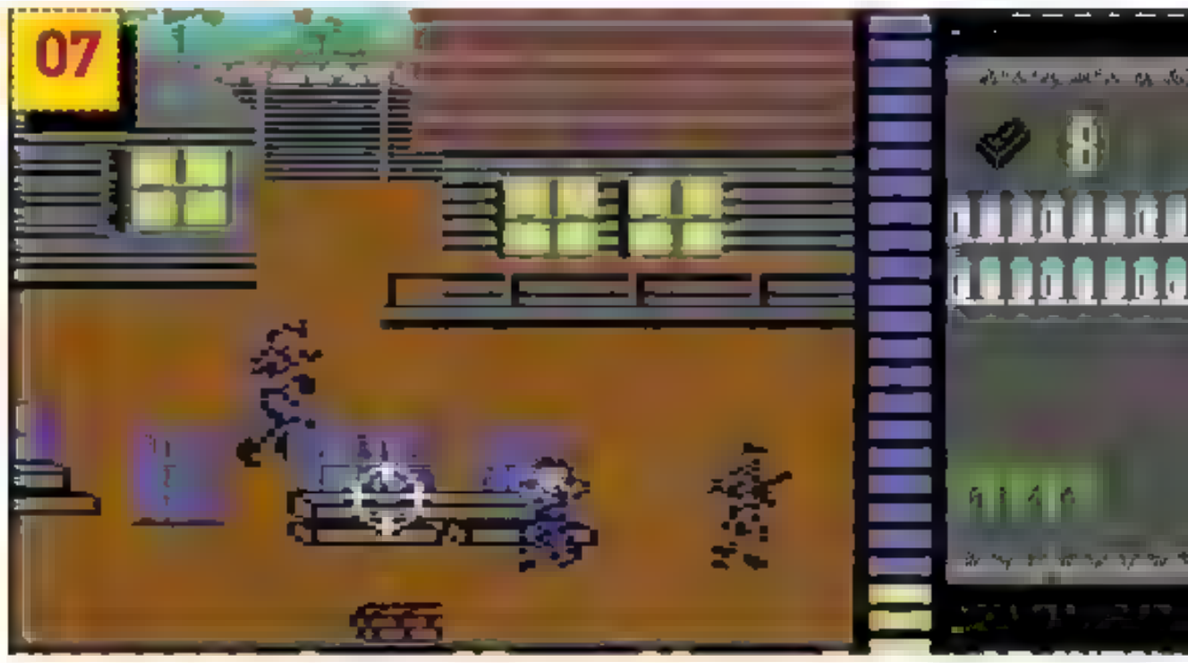
THE CONVERSIONS



Taito's Operation Wolf received a number of home conversions, but which was the best? Find out now as we play every single one...







01. NES

Worst version

The tagline for this version, 'Take No Prisoners', is a little misleading, given that your mission was to do just that. Anyway, the NES version is one of the weakest ports. The graphics are squashed, stubby versions of the arcade game, and playing it using the Zapper ironically makes the game almost impossible, with questionable accuracy and a lack of a quick fire function. Stick to the controller.

02. Master System

Best version

Now this is more like it. The console's light gun works brilliantly and far more responsively than the NES Zapper, the graphics are bold and colourful, and rockets are fired using the second controller, allowing you to position the control pad on the floor like a *Time Crisis* pedal and use your foot to launch grenades. This is as good as it was likely to get from the SMS.

03. Amiga

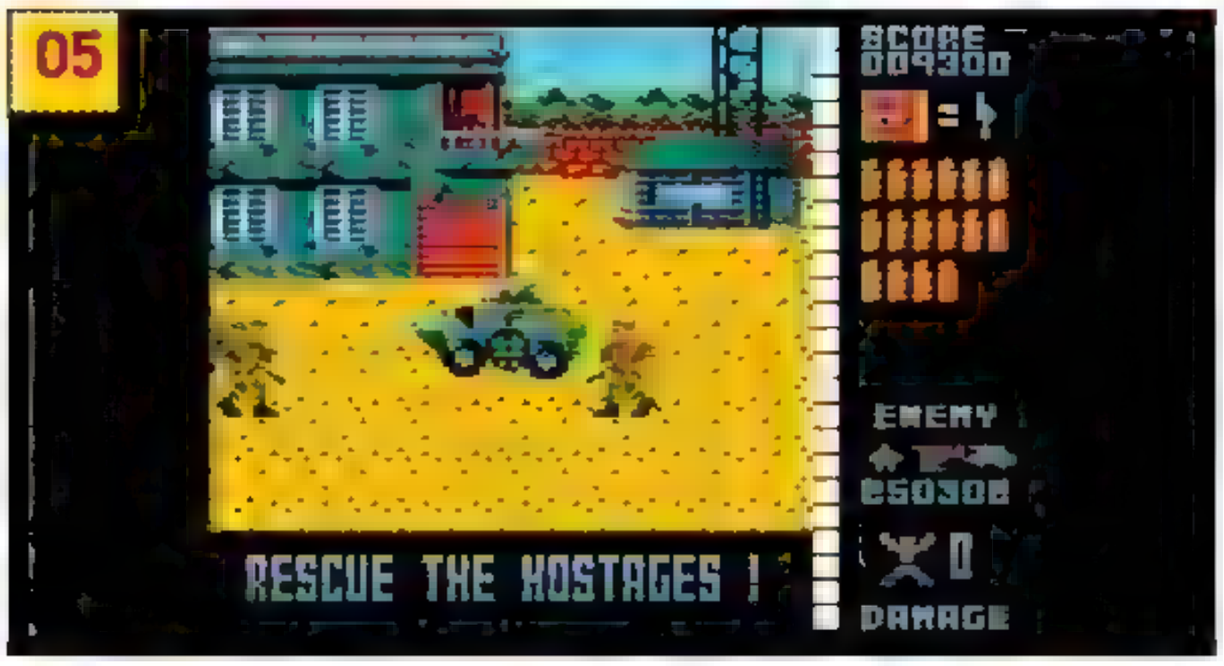
In terms of graphics, the Amiga port does a great job of replicating the arcade sprites. Also, the scrolling feels smooth for the most part, and this is a decent stab at replicating the coin-op. The only gripes we have are the fact that it comes on two disks and that load times are lengthy. Also, ammo seems sparse and there is slowdown when things get chaotic, but this isn't a bad conversion at all.

04. Atari ST

There's not much to split the Amiga and ST versions, aside from the 'usual' the graphics aren't as colourful and the scrolling isn't as smooth, although you'd struggle to notice. So the graphics look a little drabber but so what? War isn't supposed to be pretty, right?

05. Amstrad CPC

In terms of the 8-bit micros, the Amstrad walks away with the trophy. Owing to the machine's wonderfully fulsome colour palette, Arnold is perfectly suited to taking on the chunky aesthetics of the coin-op, and this conversion doesn't disappoint. The graphics look great, if a little bit garish and blocky, and the scrolling is surprisingly smooth. The controls feel solid and responsive, and even steering the crosshair using the keyboard is enjoyable.



06. ZX Spectrum
Given the frenetic nature of the gameplay, the lack of colour puts the Spectrum at a disadvantage. Regardless, this remains a decent port, and Ocean did a great job at converting the arcade game to the humble Spectrum. It starts off well, with a neat homage to the coin-op, and things go as well as could be expected. The scrolling is smooth, controls responsive and the graphics detailed.

07. Commodore 64
The C64 port is another excellent rendition. And while the colours look a little washed-out, they help make everything on screen look better defined and easier to shoot. The scrolling is nippy, and this version works brilliantly with a light gun. Another solid port.

08. PC-Engine/ TurboGrafx-16
As you would expect, the PC Engine port looks the business. In terms of visuals and arcade feel, this is the best it got in 1987 without forking out for the actual arcade board. This version also boasts a two-player mode, allows you to set the pace of the action with three speed settings, and even lets you pick the order of levels to tackle, but it isn't light gun compatible because no light gun was ever released for the PC-Engine. Shame.

DEVELOPER Q&A CONT...

» be a good idea for me to work as their top C64 programmer's 'helper', or 'apprentice', if you like. That was Colin, who already had a number of successful titles under his belt. In the late summer of '87 Colin had started on *Gryzor*, which was the first game I worked on. All the 'tunnel' sequences were mine, and Colin did the rest of the main scrolling game. That game was tough because we aimed to fit it in one load, which we managed in the end. I think every byte of the C64 memory was used, and *Operation Wolf* was the next one. Another tough game. I know I worked on all the baddie animation sequencing. I think the main scroll routine might have been mine too. I'm not sure now.

■ Did you work on any of the other versions?
CP: No. Although I could understand Z80 and 68000 code, there were a lot of technical details about the other machines that I did not know. We all tended to work with the machines we were good at.

■ Had you played the game before?
CP: Only on the arcade machine, and I was rubbish at that. I usually got somebody else to play up to the level I wanted to see. I was in my forties even then and was considered a 'Grandad' in the industry.

■ What's most difficult about conversions?
CP: It varies from game to game. The most difficult technical bit in *Operation Wolf* was the nature of the display. The right-hand part of the screen had to be static, while the left-hand part had to scroll left to right. The Commodore 64 had great scrolling capabilities, but the whole screen had to scroll. The effect was eventually obtained by manipulating the character data for the right-hand part in the opposite direction. So it was scrolling, but it appeared to be static. Where the two met was a horrible jumble, but it was covered with the energy level sprite. I got asked for years afterwards how it was managed. Programmers thought I had managed to somehow interrupt the scrolling mechanism...

I also seem to remember a lot of problems adjusting the helicopter sprites so that they did not appear in front of the static data. I think David did a lot of work there.
DB: As Colin said, the biggest problem was the static area to the right. We originally started writing a version with all that stuff at the bottom of the screen, which is far easier – ask any C64 programmer why! Then we came up with a clever solution, which was shifting the character definitions in that right-hand area one pixel at a time in sequence with the scrolling, which made those characters appear static. It took a big slice of the processing 'pie', but the scrolling was relatively slow anyway, so it wasn't a problem. We managed it somehow! ★

SPACE INVADERS

In a rare interview with Japan's godfather of videogames, **Jonti Davies** speaks with Tomohiro Nishikado about the birth of the game that triggered a revolution nearly 40 years ago

Ex-Taito visionary, Tomohiro Nishikado.

For a man who single-handedly turned his country into a nation of videogame junkies, and without whom Shigeru Miyamoto claims he would not even have joined the game industry, Tomohiro Nishikado is a surprisingly unassuming and down-to-earth kind of chap. Since 1995 he's been running his own operation, a 22-strong development studio called Dreams, just down the road from Sega in Tokyo. It's a quiet and unnoticed developer that seems to be deliberately avoiding the limelight – the discography on Dreams' website is nothing more than a list of generic terms: 'Action game for PS2', 'Communication game for DS', and so on. So it's quite odd to think that 39 years ago, when in his tenth year at Taito, Nishikado alone produced a global phenomenon in the mesmerising and boldly innovative Space Invaders.

Let's head back to 1978. "At the time," says Nishikado, "the block destruction [*Block Kuzushi*] game *Breakout* was really popular in Japan, and I was hooked on it myself. I'd made a few games up until that point, but when I experienced *Breakout* it made me want to drive myself to develop a game that would surpass it." But where many developers would have been more than content to code a superior clone of *Breakout* with a few clever enhancements (which is precisely what another Taito designer, Akira Fujita, would do a decade later), Nishikado took a completely different stance as he sought to surpass the addictive 'bat, ball and block-breaking' system of Atari's 1976 classic.

Thanks to his keen perceptive powers, Nishikado was able to see beneath the surface of *Breakout* and identify the mechanism that was causing him and so many other young Japanese to put their 100-yen coins in the slots of Atari's cabinets.

"For me," Nishikado elaborates, "the really interesting element of *Breakout* was the art of deciding on a number of targets and that sense of achievement you'd get from destroying a whole group of blocks simultaneously to clear the stage. I analysed the exhilaration players felt when playing *Breakout* like this, and I eventually decided to capitalise on this [gameplay design] by trying my hand at a shooting game where *Breakout*'s quadrilateral targets would be replaced with targets that had more interesting forms."

Had Taito's top man not told Nishikado to make changes to the design of his project, *Space Invaders* would have ended up with people taking the roles of those "interesting forms" Nishikado was looking for. "During the development process, I had the enemy targets set as humans," he reveals, "but Taito's then-president told me to stop using humans in such a way. I initially thought, 'Okay, if I substitute the humans with monster-like creatures, that should work out fine'. But then I saw a newspaper article saying that *Star Wars* had been extremely well received in America, so I decided on using space aliens instead of monsters. *Star Wars* had just hit the theatres in America and was about to be premiered in Japan, so there was a bit of a 'space boom' happening. And that's why I opted to make my game's targets aliens from outer space."

With that settled, Nishikado continued with his work as an independent entity within Taito, which is how he liked to operate in those days (even today, he seems to value autonomy: his Dreams outfit works with/for 20 or so Japanese soft cos, maintaining complete independence). Apart from the cabinet design and some sound work, *Space Invaders* was exclusively Nishikado's baby: "I let a new employee

IN THE KNOW

- PUBLISHER: TAITO
- DEVELOPER: TOMOHIRO NISHIKADO
- RELEASED: 1978
- SYSTEMS: ARCADE, VARIOUS
- GENRE: SHOOT-'EM-UP

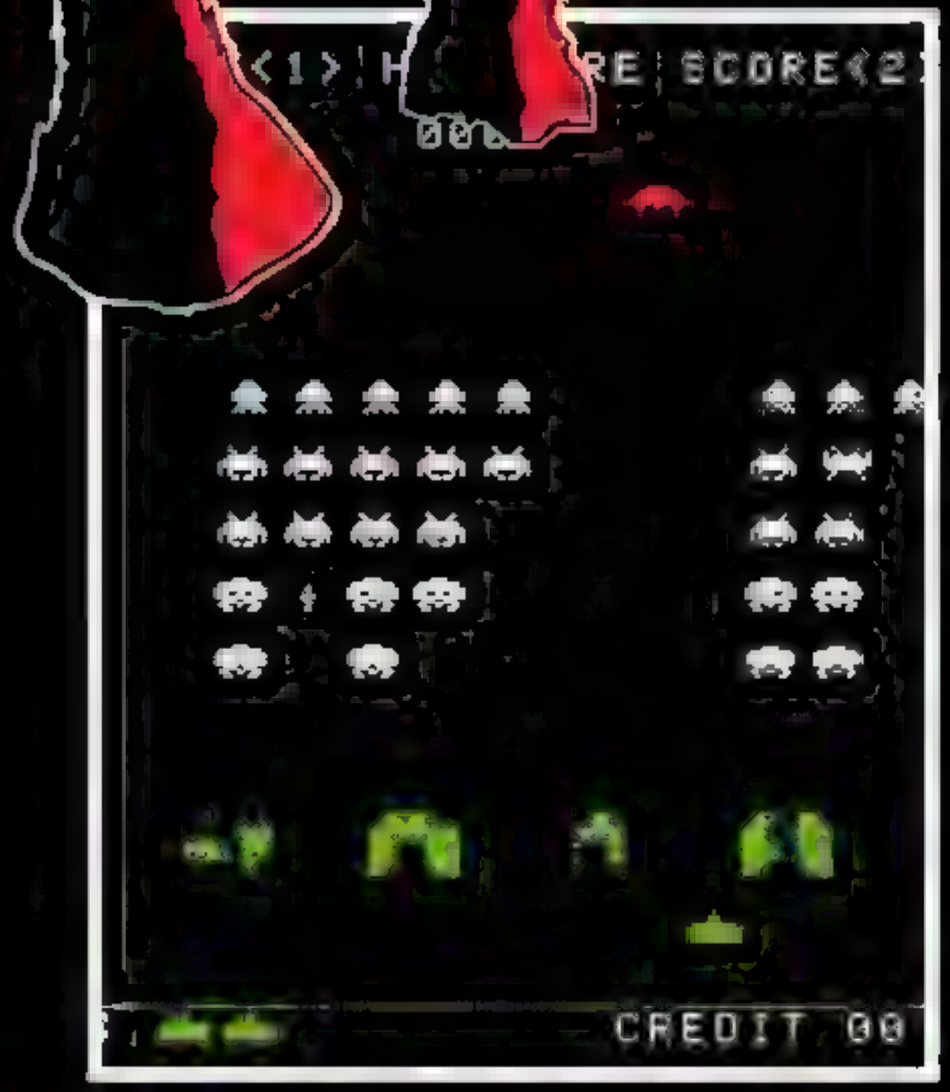
“ Star Wars had just hit the theatres in America and was about to be premiered in Japan, so there was a bit of a ‘space boom’ happening ... That’s why I decided to make my game’s targets aliens from outer space ” NISHIKADO REVEALS THAT GEORGE LUCAS’S WORK HAD AN EFFECT ON SPACE INVADERS, AS DID H.G. WELLS AND MARINE LIFE...

work on the sound source and produce *Space Invaders*’ audio effects, but apart from that, all of the other work – namely the planning, the design, graphics design, coding the software, building the hardware – I did entirely by myself.” He managed to turn the game around in remarkably quick time, especially given how his first job was the daunting task of producing his own development tools specifically for this project: “From the initial conception of the idea right through to the completion of the game,” Nishikado confirms, “*Space Invaders* took me approximately 12 months to produce.” That was the year that was.

Having joined Taito with a degree in Engineering from the electrical engineering-focused Tokyo Denki University, Nishikado was apparently seen within the company as something of a go-to man for any hardware-related tasks. His first three games for Taito – 1970’s *Skyfighter* and its sequel the following year, and 1972’s *Borderline* – were all mechanically operated creations; games without screens. Nishikado’s great skill was to improvise with existing materials and create something that was entertaining and challenging. With *Space Invaders*, however, he realised that his new project was too ambitious for the technology and software he had to hand – new tools would be required, and who better to produce them than the engineer-programmer himself?

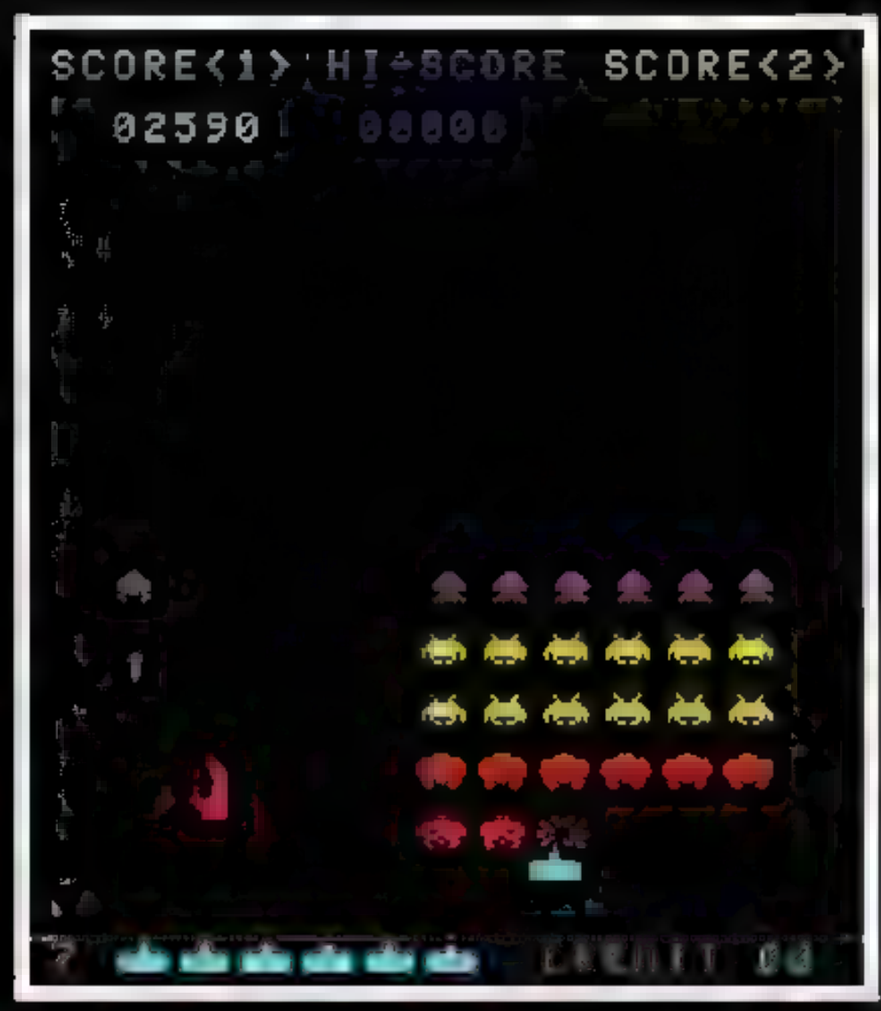
“There really was no microcomputer hardware in Japan during the late 1970s,” Nishikado laments, “so I used American hardware [including the Intel 8080 CPU] as a reference point and then took it upon myself to remodel it. Also, there was no game development environment to speak of, so I began to create my own development tools from scratch. I drew up a rough specification document and started programming while consulting that paper, but I was thinking about the efficiency of the tools I was making more than anything else, which complicated things. Because of that, I would create and program an original development tool and then realise that I’d soon need another tool as well, so I’d build that from scratch next... in the end, this process took up about half of *Space Invaders*’ entire development period.”

Those six months of preparatory work were, of course, quite worthwhile. The limitations of 1978 vintage hardware and memory capacities caused Nishikado no end of headaches, though. As he worked towards realising his *Star Wars*-inspired dreams of a game to tap into the space boom, he was also faced with the realisation that capacity and power were at a strict premium. Still, Nishikado accepted that he had to work with what was available, reconfiguring and reworking until he had the tools and hardware required to get the *Space Invaders* he could see in his mind’s eye onto a monitor. Ever the innovator, he quickly moved on from the most primitive of methodologies to something altogether more forward thinking: “At first,” Nishikado says, “I drew a plan for the screen layout on paper and then put that up on the screen, but if I wasn’t happy with it because it didn’t look good, I would have to start drawing a new frame action and put that up as a replacement, and so on. That was the process I was using – I really wasn’t able to draw any good results that way, though. So in view of that, I created something that these days we take for granted: paint



» *Space Invaders* spawned many copycats, but far from irritating Nishikado, he takes an ‘imitation is the greatest form of flattery’ approach.

» The ‘Nagoya shot’ technique in action: finding invulnerability as the invaders encroach was just one of the tricks discovered by Japan’s fanatical players of the game in 1978.



tools, whereby I could use a light pen to easily make corrections to the graphics. This enabled me to complete the graphics with ease and in relative comfort. I think that, at the time, this was a groundbreaking development tool."

Thanks to his inventive time-saving measures, Nishikado was able to work with greater efficiency once the groundwork had been done and his development environment had been established. And as his processes became smoother and less jarring, it became much easier for him to express influences other than *Star Wars*. In particular, the enemy forms in *Space Invaders* began to take on new subtleties and idiosyncrasies. Nishikado explains: "I took the octopus-like aliens from H.G. Wells's *War of the Worlds* as a starting point, to influence the design of the biggest enemy targets in the game. For the targets in the middle of the screen, I modelled them on the image of a crab, and for the uppermost enemies I was thinking of squids. I was imagining the enemies as marine life. The aliens' movement was basic because of the low memory capacity I had to work with, which meant I could only program two patterns [of movement]. But I felt that in some ways, simple was best."

It's probably just as well that Nishikado was content (to a point) with simple design, because the specs of the *Space Invaders* hardware would allow nothing greater. Getting the hardware properly and advantageously configured was in itself a great and time-consuming challenge: "For the base CPU board, I remodelled an existing game board," Nishikado recalls. "I replaced the ROM section with RAM and then developed Monitor ROM. This enabled 16 blocks of data to be input using the keyboard, which meant it was possible to use the keyboard to execute programs. I made various functions and features in the Monitor ROM, including an option that would let me save any programs I made to cassette tape. Of course, I also included a function so that I could produce graphics while looking at the monitor. I used the one kilobyte of static RAM available at the time to compose 64 units of eight kilobytes each lined up for the program area, but the performance was very bad and I remember occasions when data would become corrupt because

» The population of Japan took the title screen's encouragement to 'Insert Coins' to excess, children and adults alike.

Space Invaders Twelve

SPACE INVADERS PART II (Arcade, 1979)

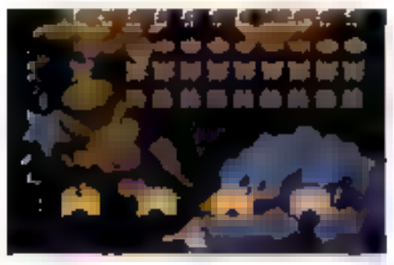
Tomohiro Nishikado's first direct sequel to *Space Invaders* was, he admits, not as big a hit as the original. Still, it had some interesting features, including increased complexity to the movement of its enemy targets.

RETURN OF THE INVADERS (Arcade, 1985)

Although Nishikado was no longer at the helm, Taito went ahead with a jazzed-up *Invaders* sequel in 1985. *Return of the Invaders* again increased the variety of Invaders' movement patterns, as well as brightening things up.

MAJESTIC TWELVE: THE SPACE INVADERS PART IV (Arcade, 1991)

Known as *Super Space Invaders '91* outside of Japan, this introduced scrolling backgrounds, shields and power-ups. It also featured a series of stages in which you needed to protect cattle from UFOs.



SPACE INVADERS DX (Arcade, 1992)

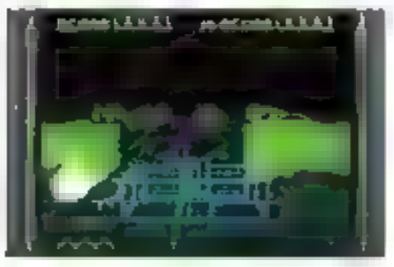
Featuring a traditional Space Invader Mode, a two-player split-screen Battle Mode and a Parody Mode, *Space Invaders DX* was an experimental game whose best features would be better developed in *Space Invaders '95: Attack of the Lunar Loonies*.

AKKANBEDER / SPACE INVADERS '95 (Arcade, 1995)

This great *Space Invaders* parody took a pun to arrive at its title. 'Akkanbe' is what kids say as they pull one eyelid down and stick their tongue out to make a funny face at another kid, a teacher or a parent.

SPACE RAIDERS / SPACE INVADERS: INVASION DAY (Arcade, 1996)

This Sammy-developed *Space Invaders* spin-off brought the series into *Earth Defense Force* territory, arming a few heroes with big guns and telling them to kill Invaders who have already landed on Earth.

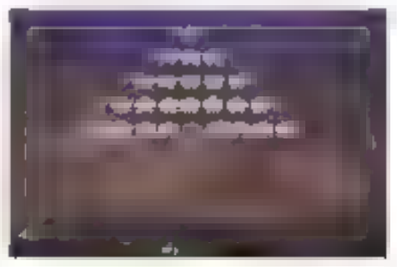


SPACE INVADERS ANNIVERSARY (PS2, 2003)

Notable for including an original 3D Mode, *Space Invaders Anniversary* was an unremarkable collection of variations of *Space Invaders* and *Part II*. The PSP attempt would prove much more worthwhile...

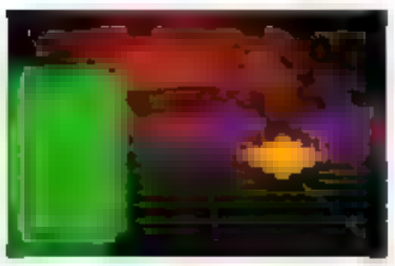
SPACE INVADERS POCKET (PSP, 2005)

This neat compilation contains four variations of the original *Space Invaders* (namely black and white, colour, cellophane colour effect and upright cab styles) as well as *Part II*, *Return*, *Majestic Twelve* and *Akkanbeder*.



SPACE INVADERS REVOLUTION (DS, 2005)

Nishikado himself developed *Revolution*, using the opportunity to incorporate touch-screen controls (digital controls remain far superior), 13 Invader types and a variety of new power-ups and settings.

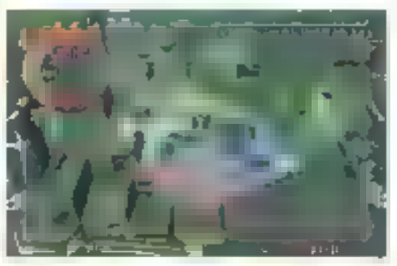


3D SPACE INVADERS (Mobile, 2006)

Providing the option to turn *Space Invaders* into a first-person shooter of sorts, the Taito-developed *3D Space Invaders* is surprisingly ambitious given that it is a game you can play on your mobile phone. Defending on the go!

SPACE INVADERS EXTREME (DS/PSP/XBLA, 2007)

Arguably the best *Space Invaders* sequel, *Extreme* is probably what Nishikado has in mind when he says: "I think that shooting games have become too difficult and too centred on catering to enthusiasts."

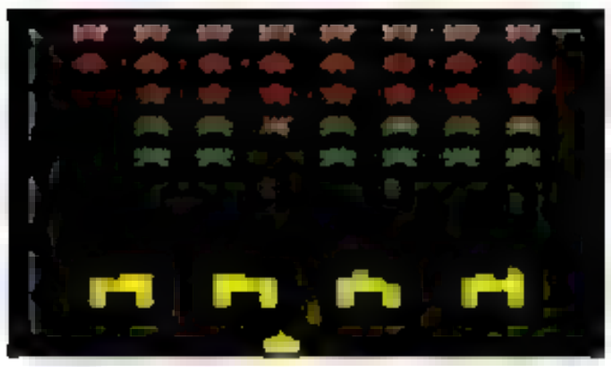


SPACE INVADERS GET EVEN (Wii, 2008)

This recently released WiiWare exclusive turns the *Space Invaders* principle upside-down by putting the player in control of the Invaders, with the objective being to complete a successful invasion of Earth.

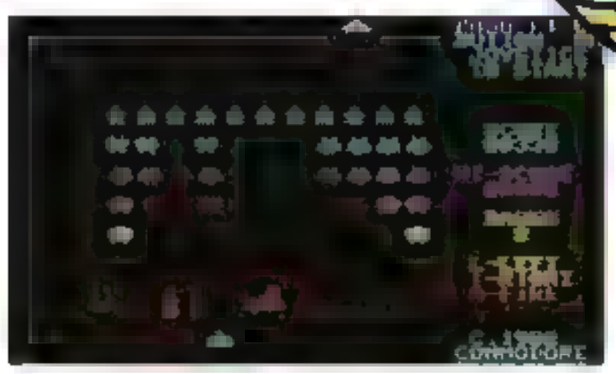
Attack of the Clones

How many times will we get away with using variations on the same pun?



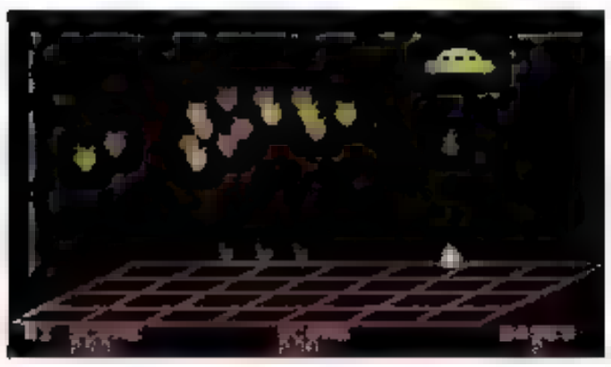
INVADERS (BBC MICRO, 198)

IJK Software's *Invaders* was one of the earliest computer format clones of Taito's international hit. Monochrome and colour versions were released (the latter only for Model B computers).



AVENGER (C64, 198)

Another early attempt at bringing *Space Invaders* home was Commodore's *Avenger*, which managed to reproduce the coin-op's formula with only a minimum of cuts and compromises.

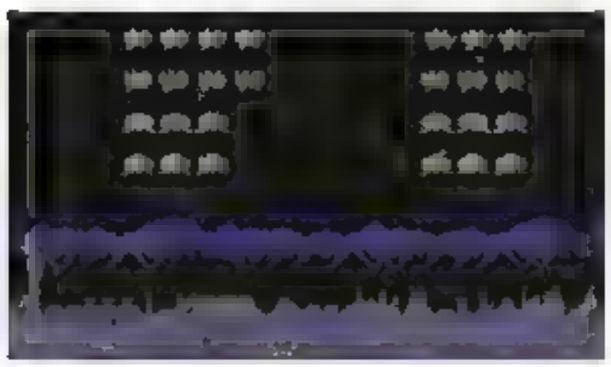


3D INVADERS (CPC

More 'quasi-isometric' than three-dimensional, this effort at replicating/improving the original *Space Invaders* formula really struggles to imitate the playability of Nishikado's game.

PEPSI INVADERS (ATAI

This limited-run promotional 'advergame', commissioned as you might guess by Coca-Cola, replaces *Space Invaders*' alien enemies with the letters P, E, P, S and I. Very clever, that.



SPACE INVADERS: FUKKATSU NO HI
('C ENGINE, 1990)

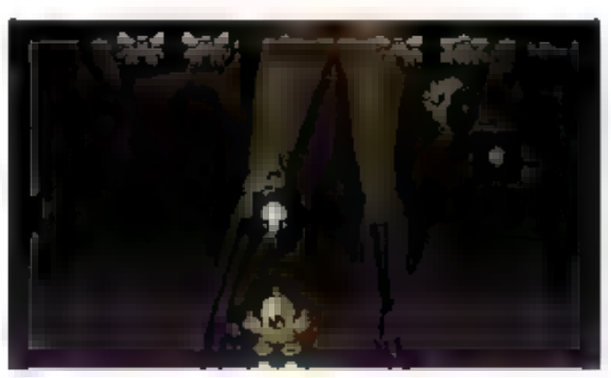
This great PC Engine conversion also includes a 'New Version' of the game, where the protective bases are removed as your ship gains the assistance of a shield.

CHICKEN INVADERS (P

Chicken Invaders is a 1999 vintage poultry-based clone of *Space Invaders*, complete with eggs and drumsticks in lieu of laser fire. As it's freeware, you might like to give this game a shot. Don't be a chicken, etc.

SPACE INVADERS (WONDERSWAN

This port of *Space Invaders* for Bandai's WonderSwan handheld replicates Nishikado's original work, only inverted as black sprites on a clear background.



SWEET INVADERS (MOBILE, 2006

In one of the least imaginative and most shameful conversions of *Space Invaders*, 2006's *Sweet Invaders* 'innovates' by displaying bitty 'stunners' in the background of its 'erotic' take on the game.

of static noise. Nowadays, developers have gigabytes of memory to work with, but at the time I only had kilobytes..."

In spite of those trying limitations, Nishikado must have realised that he had a hit on his hands when groups of Taito employees began gathering at his desk for a go on the prototype version. "Once the game was close to being finished, quite a few people from [Taito's] development division were so pleased with it they began to play it regularly," he smiles. "However, because they were playing *Space Invaders* using my development tools, I wasn't able to get any work done while they were playing, which bothered me a lot. Having said that, although I developed *Space Invaders* alone, I think that in the end it was improved and perfected thanks to consultation with the people who were playing the game around me."

While the floor-level workers at Taito were rightly impressed with *Space Invaders* and were the first people in the world to become hooked on it, the 'Suits' were, according to Nishikado, a picture of doubt and scepticism: "In those days I was given complete freedom to work on games as I saw fit, so at the start of the project no one expressed any opposition to the idea. Along the way, though, I had to explain – mostly to businesspeople and salespersons – the game's shooting system and how there was nothing else to compare it with at that point. I had to outline how being invaded by these aliens would result in a game over, how enemies would shoot at the player and so on. That was difficult; they generally didn't give *Space Invaders* a good evaluation – they didn't seem to rate it very highly."

Part of the execs and salespersons' problem with the game was that it did something unusual; something they either couldn't comprehend or simply didn't see as an appealing factor in a project they were backing: "Up until *Space Invaders*, shooting games didn't feature enemies that would attack the player," Nishikado explains. But that wasn't the only feature that met with doubting voices: "Also, even if you still had missiles remaining, if the Invaders got to the bottom of the screen and successfully carried out their invasion, it would result in a game over. To tell you the truth, both of these features were vehemently opposed by the sales and businesspeople..."

The final build of *Space Invaders* satisfied its creator to an extent, but Nishikado had some regrets even as soon as the game was in the wilds of Japan's 'game centres' (the places we'd call arcades). "The capabilities of the *Space Invaders* arcade hardware were really low," Nishikado sighs. "I wanted to produce colourful images, but it just wasn't possible with that hardware – so as soon as the game was complete, I began to develop a plan for new high-level hardware." Initially, that wasn't possible, so the game appeared in monochrome form. Eventually, Taito came up with an ingenious solution that went some way towards placating Nishikado's desire for a colourful game: multicoloured cellophane screen overlays were placed over the displays of existing cabinets. Over in the States, Bally/Midway would pull the same trick with its upright cabinet.

While *Space Invaders* was by no means a rushed job – in spite of completing work on the game in just 12 months, Nishikado was not working to a set deadline as such – the limitations of the technology at his disposal meant the final build was not quite where he wanted it to be: "For one thing," says Nishikado, "I really wanted to include a feature in the original *Space Invaders* where the Invaders would split up and form groups... but at least this ended up appearing in *Space Invaders Part II*."

If Nishikado was slightly unimpressed by his own production, the same could not be said of Japan's population at large.

» *Space Invaders*' clear outline of its high-score system ensured that players would try to play cleverly and keep on returning.

» Tomohiro Nishikado's work remains relevant 37 years on from its conception, marking the game out to be, what we already knew, one of the greatest ever to grace our planet.

"Businesspeople and salespersons ... generally didn't give Space Invaders a good evaluation – they didn't seem to rate it very highly" THE SUITS COULDN'T SEE A GLOBAL HIT EVEN IF TOMOHIRO NISHIKADO DEMONSTRATED AND EXPLAINED IT TO THEM

Tapping into the tremendous local interest in science fiction, *Space Invaders* was very much of its time – a 1978 vintage game for the inhabitants of Japan in 1978. The coin-op was an instant hit, zapping games right into the core of Japanese culture and even reportedly causing a shortage of 100-yen coins as a by-product of its phenomenal success. When we mention this myth/legend to Nishikado, he seems like he wants to laugh it off as a fanciful exaggeration, but it definitely holds an element of truth, as he concedes: "The effect of *Space Invaders* was certainly noted among businesses using 100-yen coins a lot, but I don't know whether the coins actually became less common because of the game..."

Nishikado can't take credit for the housing of his PCB, mind, as he had nothing to do with the coin-op cabinet's design: "The cabinet was designed and produced by a separate team," he says. Like the Western versions of *Space Invaders* manufactured by Bally/Midway, Taito's Japanese *Space Invaders* cabinets were eventually presented in different flavours – some upright machines, some in a cocktail-table style. After some comparison work, Taito's preference was for the table format, as Nishikado relates: "Originally, the cabinet was intended as an upright design. The table-type cabinet saved a lot of space, though, so that version ended up supplanting the upright model." *T.T. Space Invaders*, as it was dubbed by Taito in Japan, was a sensationally popular machine. Later on, however, Taito would release an upgraded version of the upright, which would ultimately prove to have a longer life in Japan's quickly changing game centres. The later addition of proper colour graphics (a notable improvement on the 'black-and-white graphics with colour overlay' solution) cemented *Space Invaders*' place as a 'safe bet' in bars, game centres and other locations.

The legacy left by *Space Invaders* is so immense and multi-branched that it's almost impossible to quantify the game's influence on the world. It has appeared in countless TV shows, either by way of a passing reference or as a central theme; it has provided the impetus for numerous musical projects (search Google Images for the sleeve to 1981 dub LP *Scientist Meets the Space Invaders*); it has even inspired artistic movements. Yet in Japan, the game itself was – like most trends here, it has to be said – a relatively short-lived phenomenon. On the one hand, Nishikado reckons: "Sales of *Space Invaders* were really much higher than I had anticipated." But on the other, matter of factly, he tells us: "The following year, once sales of the game had started to decline, I was asked to produce *Part II*, which I developed dutifully, but it wasn't such a big hit [as the original]."

1978 was a hugely significant year for Taito and games in Japan in general, but in terms of the volume of notable games, it would be superseded year on year thereafter. As early as 1979, Nishikado was seeing his compatriots gaining ground, even if much of the basis for their successes had been laid by *Space Invaders* and what Japan collectively termed the 'invader game' boom: "When I saw how smooth the movement was in Namco's *Galaxian* – and how colourful it was, too – I remember thinking *Space Invaders* had lost [the battle]. There were many shooting games that used *Space Invaders* as a basis after that," Nishikado concludes, although he doesn't sound at all bitter about that situation. Without *Space Invaders*, there's a chance that Japanese shoot-'em-ups would not have developed, or at least not in the amazing way they did during the 1980s and 1990s. It's not merely Taito that owes Nishikado a (metaphorical) debt, but also the other Japanese developers (Namco with *Galaxian* included) who took inspiration from *Space Invaders* and, on a global scale, the millions of people whose first experience of the power of videogames was the heroic act of saving the Earth from invasion by pesky aliens who were wont to scuttle their way towards the planet's surface.

Nishikado isn't keen on the latest examples of shooting games – "In recent years, I think that such games have become too difficult and too centred on catering to enthusiasts," he tells us – but he remains committed to the enduring phenomenon that began in his office at Taito in early 1978: "I still want to make simple shooting games," he smiles.

DEVELOPER HIGHLIGHTS

» SPEED RACE DX
SYSTEM: ARCADE
YEAR: 1975

» SPACE INVADERS PART II
SYSTEM: ARCADE
YEAR: 1979

» LUNAR RESCUE
SYSTEM: ARCADE
YEAR: 1979

STAGE 3
CRED

Golden Axe

...THIS FANTASTIC

» SEGA
» ARCADE
» 1989

***Golden Axe* is a strange game.** ...is not the greatest side-scrolling beat-em-up ever made, and it rips off plenty of other superb titles, but good grief is it fun to play through. After all, what other game from the era allows you to ride skeletons, ride around on mythical creatures and cast powerful magic? None, that's what.

While the likes of *Rastan* and *Ryger* featured a similar theme, neither matched the fantastical environments that *Golden Axe* boasted. Indeed, in the half-hour it took me to complete this game I've still got the magic touch... visited a desolate village, journeyed across the back of a giant turtle, before finally flying to Death Adder's fortress via a giant, flying eagle. Quite a journey, I'm sure you'll agree.

The enemies you face are no less exotic and consist of Harryhausen-styled skeletons (some of the hardest foes in the game by the way), mace-wielding giants, bushy Amazonians and gigantic, armour-clad knights that carry swords longer than your average character. There, of course, comes the final showdown with old Death Adder himself, a huge monstrosity of a man who wields the titular Golden Axe.

Your able warriors, the stout Dwarf Gilius Thunderhead, beefy barbarian Ax Battler and the sexy Tyris Flare are more than able to deal with Death Adder's minions (and if you get bored, picking up their fallen weapons and using them against your foes can always help on the back of one of *Golden Axe*'s many mythical beasties and smoke 'em with a handy fireball. For easy tails though, it's your magic potion's to rely on. Each warrior favours a certain element, lightning for Gilius, earth for Ax and fire for Tyris, which can be powered up by picking the occasional pixie in the area and grabbing its dropped potion. Who says time doesn't pay? When your gauge is nearly filled you can let loose with anything from a minor earthquake to summoning this bad boy, on the right, to unleash the smell of burning Death Adder in the morning. ★

RETRO REVIVAL

ITS 5
PUSH 2P START

THE LEGACY OF DRAGON'S LAIR

Cinematronic's Dragon's Lair remains one of the most iconic arcade games of all time and has been released for almost every computer and console platform under the sun. As the classic arcade game enters its third decade, Martyn Carroll unravels the tangled history of Dirk's daring adventure

Dragon's Lair is the most divisive of games. For some it doesn't even deserve to be called a game, as it's seen essentially as an interactive movie where the player does little more than prod Dirk away from danger. For others, the title alone is simply enough to excite the synapses and whisk them back to 1983 when boggle-eyed gamers bumped and jostled to get a glimpse of the extravagant new game that featured cartoon-quality sound and animation. For those amazed by the extract mode, amused by Dirk's screams and confused by Daphne's one-piece when the game first arrived in arcades over 22 years ago, there will always be something special, even magical, about *Dragon's Lair*.

While fans are always incredibly quick to argue that *Dragon's Lair* is more than just a movie, the title has certainly benefited from the type of bonus material you'd find attached to treasured films. Releases on CD, DVD and more recently HD-DVD and Blu-ray have featured mini-documentaries and interviews with the creators alongside with deleted scenes and other extras. As such, the story of how *Dragon's Lair* came together is rather well known, but it's always worth recapping simply because the game's origins are actually somewhat surprisingly primitive.

The concept was first developed by Rick Dyer in 1979. Having quit his job at [illegible] where he developed handheld LCD games, Rick, with his Advanced Micro Computer Systems, Said Diego, Holding [illegible] straight, he created a fantasy-themed adventure game that used a roll of cash register paper as its 'display'. On the paper Rick added various scenes, each with a hand-drawn picture and a text description. The player would choose their desired multiple-choice option and the computer would quickly spin the roll to display the required scene.

Rick went on to replace the paper roll with a strip of film, then added sound via a tape recorder, and later still transferred his adventure game to a LaserDisc. This new technology allowed him to randomly and almost seamlessly jump between scenes, but he was still using static images. The whole thing was a bit flat. He needed to breathe life into it, and having seen the animated feature *The Secret Of NIMH* at just that.

From LA-based Don Bluth Productions, the studio formed by Don Bluth, Gary Goldman [illegible]

publicised resignation from Walt Disney Productions. Life as an indie was hard however. *NIMH* opened to limited success in June 1982 and production of their second film was derailed by industry-wide strike action.

Picking up the story, Gary Goldman says: "We suffered a union strike at the end of July. Our crew of about 110 artists and technicians were reluctantly escorted from the studio. That strike lasted 73 days and during that time, our investors, concerned about the ramifications to the budget, decided to back out. Don, John, our production manager, our receptionist and I were the only ones left in the building. We thought our company was done. Two months into the strike we were contacted by Rick Dyer. He came to the studio and pitched his idea of us partnering with him to make an animated LaserDisc arcade game. He had seen *The Secret Of NIMH* with his wife and told her that we had to be the ones to produce the animation. So, even though we didn't really know anything about games, we agreed to join him in the adventure – videogames were not in union contract at that time. There was a sigh of relief among us regarding our destiny as a company."

Relief quickly turned to panic as team Bluth had just 16 weeks to create something that could be demonstrated at the Amusement Operators Expo being held in Chicago in March 1983. Rick Dyer knew that other companies were developing LaserDisc games so they needed to be first to market, in the US at least. That frantic four month period witnessed the creation of Dirk the bumbler, Daphne the beauty, the castle, the quest, the pitfalls and pratfalls. Hundreds of ideas were turned into thousands of drawings as *Dragon's Lair* came to life.

March arrived and the team had three scenes (or 'rooms') ready to show off at the expo. And show off they did. "We couldn't believe it," says Gary. "*Dragon's Lair* became a national name. All the news stations across the nation reported on the convention, showing colour footage of the gameplay. The distributor, Cinematronics, was able to pre-sell more than 3,500 units of the unfinished game. All of the costs for production, programming and game cabinet construction and shipping were paid for with advances on those sales."

Reaction to the game was unanimously positive. A typical viewpoint appeared in the July 1983 issue of *Video Games Magazine*. "The 1983 AOE offered very little we haven't all seen before," reported John Holmstom on the expo. "Most of the new games were variations on recognisable and overused themes which aren't going to shake up many arcades. Only one game stood out from the rest – *Dragon's Lair*. It's such a revolutionary concept that it will undoubtedly cause a great deal of excitement in the arcades. It could ultimately make the other games at the show seem like mere antiques."

Buoyed by the success and with completion costs covered, the team returned to California to finish work on the game. In total the project would feature around 20 minutes of hand-drawn animation. "We completed it in May," continues Gary. "Rick Dyer started testing it in arcade situations, making changes and excluding rooms that didn't entertain or confused the players. He also tweaked the programming 'event' windows – the amount of time allowed to make your move. The game started shipping to arcades in early July, selling in excess of 8,000 machines."

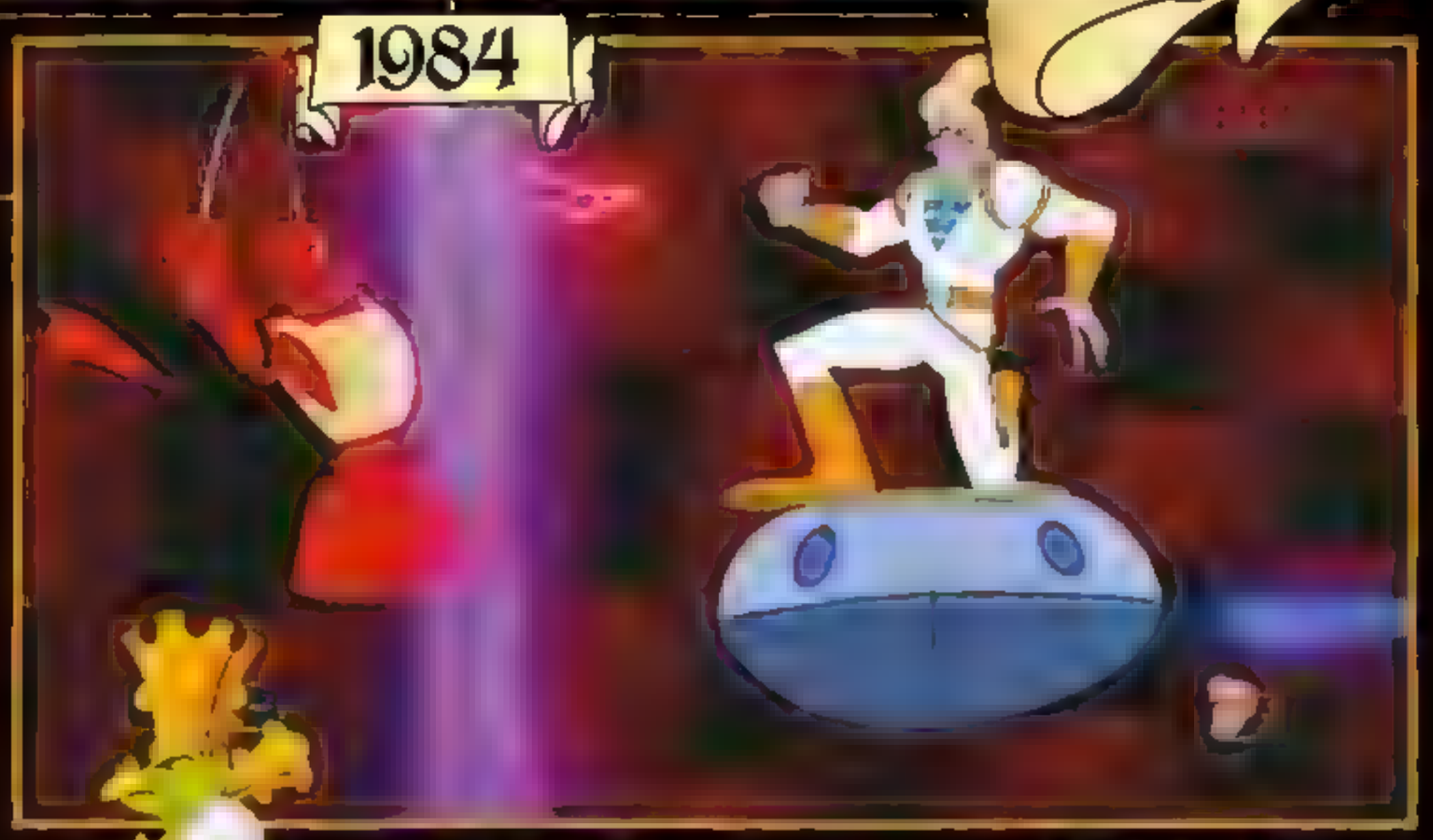
READERS REMEMBER

■ "I first saw it in the arcade that was tacked onto the side of my local Odeon cinema. I was utterly blown away by it. I must have stood there and watched that attract sequence about 20 times and knew the voiceover off by heart. I didn't play it because it was expensive and I wanted to buy sweets, so at that point it was the best game ever too me. Obviously when I did eventually play it I reaused otherwise, but for a while that game was just magical."

THE LAIRD

DRAGON'S SPAWN

Sequels to – and spin-offs from – the original arcade game



1984

SPACE ACE (Arcade)

■ This delightful follow-up to *Dragon's Lair* is faster (it's relentless) and funnier (thanks to the introduction of dialogue). Branching paths and varying skill levels increase replay value. It's regularly bundled with the *Dragon's Lair* arcade games, creating a loose trilogy.

1990

DRAGON'S LAIR (NES)

■ Elite's first attempt at dropping Dirk into a platform game was a disaster. The character graphics are detailed and large, but the animation is sluggish and the controls are clunky. The difficulty level is crazy: you deserve a medal for finishing the first screen.

1993

DRAGON'S LAIR (SNES)

■ Third time lucky for Elite. This platformer is hardly groundbreaking, particularly within the SNES library, but it's polished and engaging and lots of fun. It's challenging too, though fair, and there are plenty of nods to the original arcade game to spot.

2002

DRAGON'S LAIR 3D (PC)

■ Part sequel, part update, this return to the world of *Dragon's Lair* is not unwelcome. It plays it safe, adopting the typical action-adventure-platformer approach, but the cel-shaded visuals are spot-on and the animation is authentic. A 'nice' game.

1991

DRAGON'S LAIR (GB)

■ Subtitled *The Legend*, this handheld spin-off is a straight rip of Spectrum platformer *Roller Coaster*, also by Elite. It helps that the source is a brilliant little game, but no real effort has been made to link the game to the *Dragon's Lair* world. Bizarre.

1991

DRAGON'S LAIR 11 (Arcade)

■ This belated sequel arrived in arcades seven years late – and it was probably seven years too late. For fans though there's real magic at work here. The animation is top drawer, with proceedings taking a surreal turn as Dirk is whisked through time.

2004

DRAGON'S LAIR III (PC)

■ Mark this as a failed experiment. It's basically *Dragon's Lair 3D* turned into an interactive movie so that the gameplay matches that of the original. A definite whiff of 'Why bother?' makes this one for completionists, or possibly masochists.

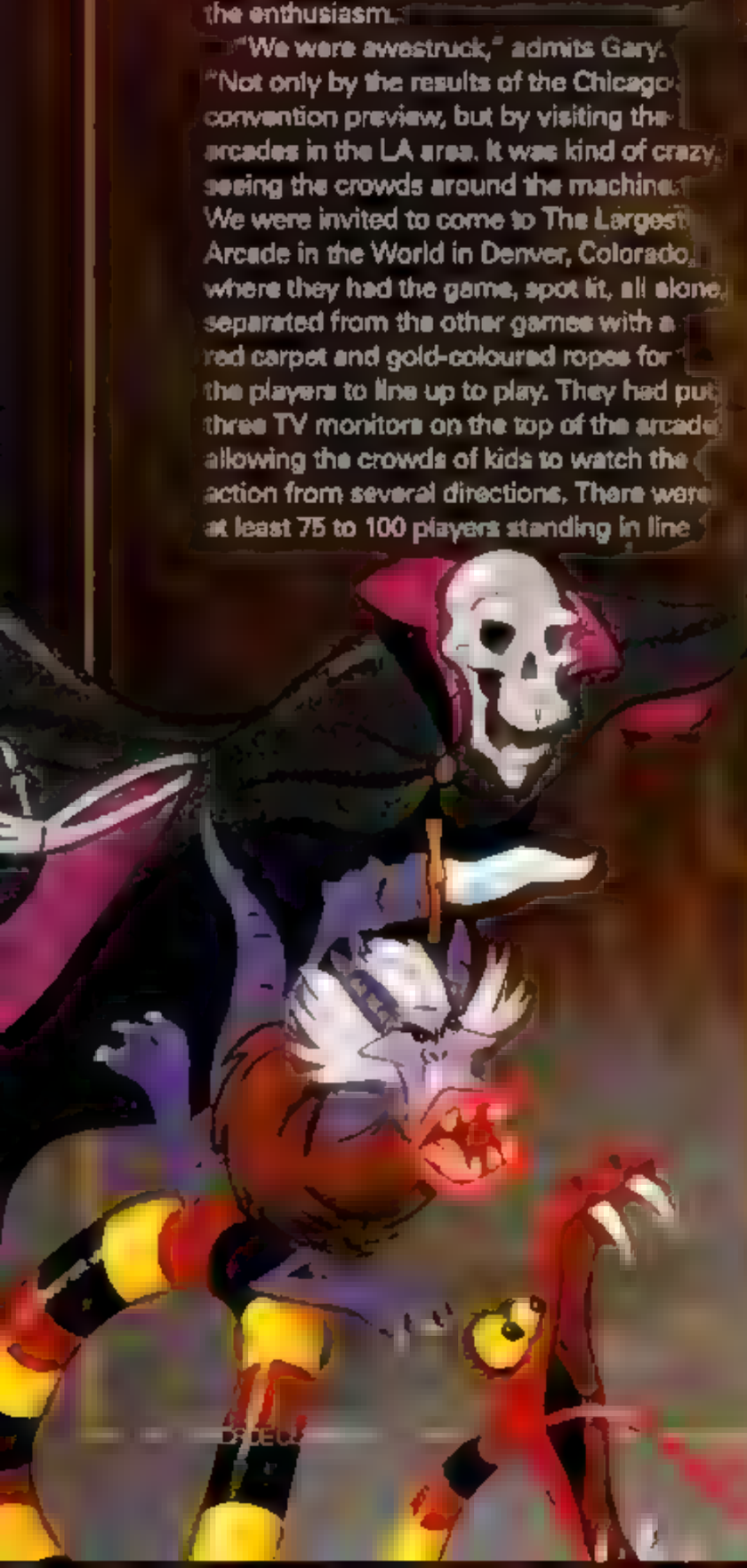
During that summer of '83 it seemed that everyone was playing – or at least standing in line waiting to play – *Dragon's Lair*. It was massively popular. Operators plonked TVs on top of machines so that punters could more easily watch the game being played. The fact that it cost twice as much to play as other machines (fifty cents per credit in the US, rather than the usual quarter, to cover the increased outlay for the LaserDisc technology) didn't dampen the enthusiasm.

"We were awestruck," admits Gary. "Not only by the results of the Chicago convention preview, but by visiting the arcades in the LA area. It was kind of crazy seeing the crowds around the machines. We were invited to come to The Largest Arcade in the World in Denver, Colorado, where they had the game, spot lit, all alone, separated from the other games with a red carpet and gold-coloured ropes for the players to line up to play. They had put three TV monitors on the top of the arcade allowing the crowds of kids to watch the action from several directions. There were at least 75 to 100 players standing in line waiting to play. It was like the lines to see *Raiders Of The Lost Ark*."

One of those waiting impatiently in the line for *Dragon's Lair* was Jeff Kinder. "I was on vacation with my family in Wildwood, New Jersey," says Jeff, who years later would establish a *Dragon's Lair* website. "As I walked around an arcade I noticed a huge crowd around one of the games. A TV that was sitting on top of the maching and when I saw the screen I said to myself 'That's [illegible] showing cartoons on the TV'. When I finally edged through the crowd and saw that those cartoons were actually part of the game I just couldn't believe it. My jaw hit the floor. After waiting 15 minutes for my turn, my game lasted about 15 seconds. But I was hooked."

Someone else clamouring to play was Martin Touhey. Spellbound by the game as a wide-eyed nine-year-old, he's currently putting together a feature-length documentary entitled *Inside The Dragon's Lair*. "I walked into the arcade one day and a crowd of people were all huddled around this one game," he says. "My young brain could barely even comprehend what was going on. Two of my favourite things, animation and videogames, coming together in such harmony that it felt like a wish come true. I was in a state of euphoria and I hadn't even played the game yet. Once I did get to play the game, however, it did to me what it did to many other gamers – it took my fifty cents and killed me quickly. My attraction wasn't diminished though. It was such a different concept at the time that there was no way I could ever forget it."

The game was a success for all parties involved. Don Bluth Productions, who initially viewed *Dragon's Lair* as a stop gap between movie projects, ploughed the

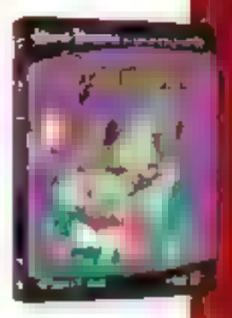


READERS REMEMBER

"I remember seeing it when I was but a youngster and being amazed at the graphics (compared to anything else in the arcade at the time). The kid I was watching must have played it to death, as it seemed I was watching a full cartoon. I thought it was easy. I popped my coins in and lasted about ten seconds... Didn't play it much after that."

NOKGOD

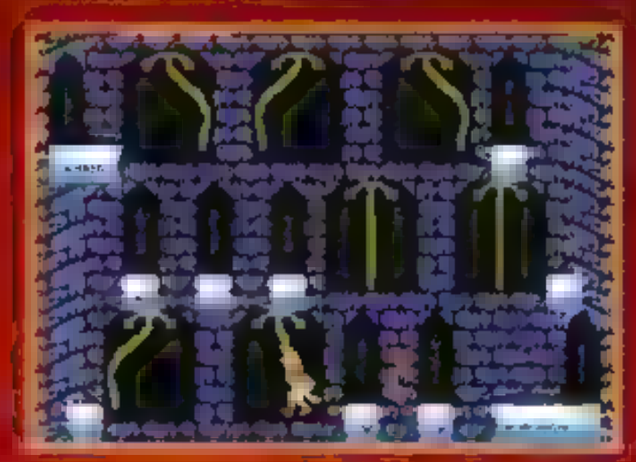
CARTOON TIME

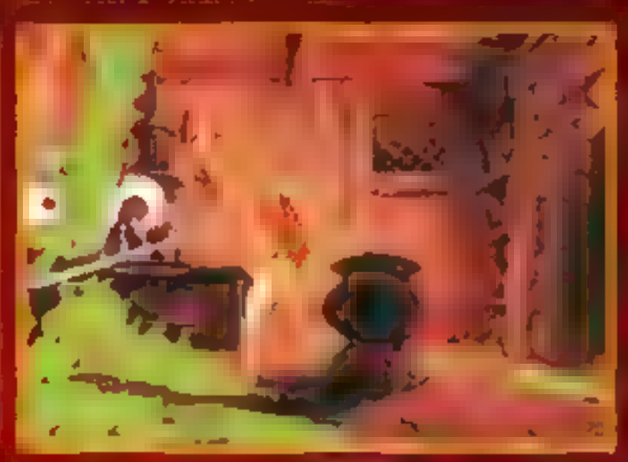


Cartoon serials based on hit videogames have occupied Saturday morning TV schedules for years, stretching right back to the early Eighties. *Dragon's Lair* was a better fit than most, being based on a game that actually boasted traditional animation itself. Ruby-Spears Productions developed 13 episodes that were initially broadcast on the American ABC network between September 1984 and April 1985.

In each 30 minute show, Dirk (who now spoke rather than just shrieked) would rescue Daphne or protect the kingdom from Singe the dragon and his conniving cronies. The animation was adequate, the stories were diverting and the whole thing was good fun – providing you were eight years old. Co-creator Gary Goldman singles out the series as the one the main reasons why *Dragon's Lair* remained in the public consciousness long after the game's popularity had cooled in the arcades.

The show has been re-run several times on US television over the years and in 2011 Warner Bros released the complete series on Region 1 DVD.





profits into videogame development. Its second LaserDisc game, the sci-fi romp *Space Ace*, arrived in 1984 and this was followed by a *Dragon's Lair* sequel. Gary says: "The money flowed and the profits funded *Space Ace* and 70 per cent of *Dragon's Lair II*." 70 per cent? In March 1984, distributor Cinematronics pulled the plug on the sequel despite it being close to completion. It appeared that the novelty of LaserDisc games had rapidly worn off and their popularity was on the wane. The craze was short-lived and it pretty much began and ended with *Dragon's Lair*. Yet the game's legacy was to live on...

It didn't end up in the home and *Dragon's Lair* was no different, despite it being impossible to convert the game to the computers and consoles of the time with any degree of accuracy.

Mere insurmountable tasks weren't about to stop Coleco however. The manufacturer was planning an add-on module for its ColecoVision console that would play CED discs (effectively vinyl records that stored video). *Dragon's Lair* was the perfect killer app for this new kit and Coleco reportedly stumped up $2m to licence the game. Unsurprisingly, plans for this ambitious add-on were soon scrapped and Coleco was forced to adapt rather than convert the game. The result was a multi-load affair for its Adam computer that featured scaled-down versions or rather interpretations of popular scenes from the original. The game was released in 1984 and available on both cassette (that cleverly pre-loaded the next level while you were playing the current one) and floppy disk.

The Adam was not a popular computer, so it was left to UK firm Software Projects to give Coleco's version greater exposure. Software Projects boss Alan Maton picked up the Adam version while on holiday in France and brought it back to show his team in Liverpool. "Software Projects had the Adam version and we were all looking at it," recalls in-house programmer [illegible] Turbo loader and saw that just as the Adam loaded the next level from tape while [illegible] do the same. 'Go for it,' said Alan. 'Sort out the copyright issues!' And so that's [illegible]

READERS REMEMBER

■ "When this came out... couldn't believe my eyes. It was expensive but I had to have a go. I died almost instantly and never played it again having felt utterly cheated out of my pocket money. I just watched everyone else waste their money instead!"

FREDGHOSTMASTER

WE FIRST RELEASED THE AMIGA VERSION AT THE WORLD OF COMMODORE EVENT AND WE HAD TO KEEP RUNNING BACK TO THE OFFICE TO GET MORE DISKS

what we did! Writing *Dragon's Lair* for the C64 was an absolute blast."

John's C64 version was released in late 1986, with Spectrum and Amstrad CPC versions following a few months later. Review scores were so-so, with many critics bemoaning the game's tough-as-boots difficulty level, but the allure of *Dragon's Lair* was still strong and the game was a solid chart hit. In 1987 Software Projects created a fresh set of levels based on arcade scenes not featured in the Adam original and released it on C64, Spectrum and CPC as *Dragon's Lair Part II: Escape From Singe's Castle*. A 'new' plot involved Dirk venturing back into the castle to steal some of Singe's gold – presumably to keep Princess Daphne in the pre-kidnap lifestyle she was accustomed to.

In 1988, Randy Linden and David Foster of US publisher ReadySoft acquired the rights. Their plan was admirably bold – to release a faithful version of *Dragon's Lair* for the Amiga computer. The lengthy process involved separating the foreground elements from scenes with static backgrounds and then reducing the colours used in these elements (to 16) and compressing them. Having minimised the data, they tackled the ▶

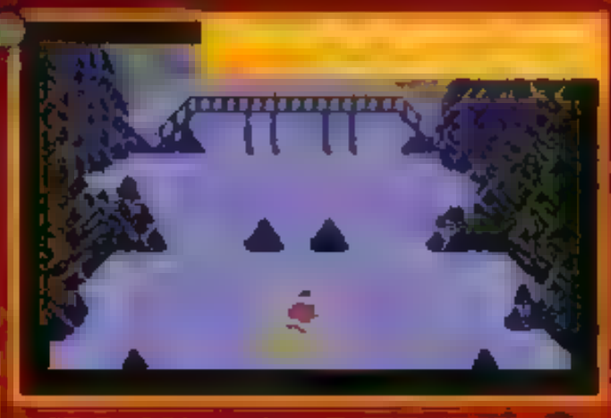
challenge of optimising processor usage and maximising disk space. The finished product shipped on six full-to-the-brim floppy disks and yet featured just 15 per cent of the arcade game.

It was a huge hit regardless. "We couldn't produce them fast enough to meet the demand," says David. "We first released the Amiga version at the World of Commodore event in Toronto in December 1988 and we had to keep running back to the office to get more stock. We ended up selling more than 1,000 units at the show alone. In the first three months we produced 80,000 units, times six disks each. We had a custom disk format designed to fit more data on each disk and also thwart piracy, so we were going flat out copying disks on reworked Amiga external drives with the rotation speed tuned down. The drives kept breaking down and we would have to keep buying new ones."

READERS REMEMBER

■ "I was completely mesmerised by *Dragon's Lair* and loved the intro, but then again I was only around six or seven years old when I first saw it and never had the chance to play it. Back then I thought what I was seeing was actual game graphics rather than just stock footage running off a LaserDisc."

TOXIEDOGG



Following its successful debut on the Amiga, versions for the ST, PC and Mac were released. ReadySoft then converted a second set of scenes and, like Software Projects, released them with the subtitle *Escape From Singe's Castle*. For Dirk's return, ReadySoft introduced some player aids in the form of three difficulty levels, save game slots and clearer on-screen hints. "I think the helpers make the game much more accessible to casual gamers," says David. "We have found that most of our customers are interested in getting through the game and seeing all of the animation, bringing back the memories

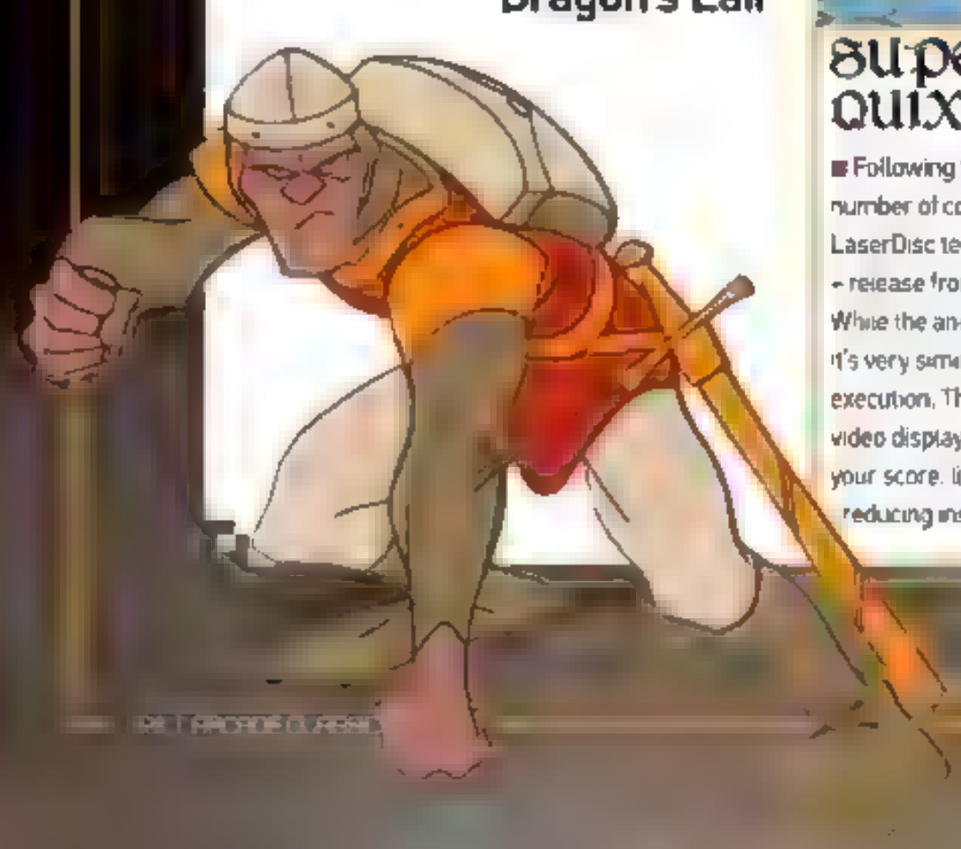
and not so much having to memorise all the exact moves and timings. We make sure that the helpers can be turned off for those interested in the true *Dragon's Lair* experience." The game also included several new scenes designed in-house at ReadySoft.

The brisk sales of these home versions demonstrated that *Dragon's Lair* still resonated with gamers. It wasn't too surprising then when interest was shown in the partially completed sequel. Leland Corporation approached the Bluth team and offered to finance the completion and in 1991 *Dragon's Lair II: Time Warp* finally arrived in arcades. "I'm not sure

"THE PHENOMENON IS SIMPLE. IT WAS A HISTORIC AND MEMORABLE MOMENT IN THE LIVES OF THOSE WHO SAW IT WHEN IT FIRST APPEARED IN THE ARCADES"

DRAGON'S LEGACY

Seven games that owe a debt of gratitude to Dragon's Lair



SUPER DON QUIX-OTE

■ Following the success of *Dragon's Lair*, a number of coin-op manufacturers hitched with LaserDisc tech. This was the first – and only – release from Japanese developer Universal. While the animation is far from Bluth standard, it's very similar to *Dragon's Lair* in story and execution. There's one difference however – the video display is overlaid with graphics showing your score, lives etc – [illegible]s are also displayed, reducing instances of trial and error

COBRA COMMAND

■ Perhaps best known as an early Mega-CD FMV game, Data East's *Cobra Command* was actually released in arcades in 1984. Gameplay is a mix of shooting enemy craft and rapidly following directional commands which are relayed over the chopper's radio by your officer. The animation from the Toei studio is great and the action barely lets up for a second. Forms a fantastic double-bill with the 1985 car chase epic *Road Blaster* (*Road Avenger*).

MAD DOG MCREE

■ This light-gun game sees you shooting no-good troublemakers in a Wild West town. Featuring video footage of real actors delivering terrible lines in hackneyed situations, the actual gameplay boils down to the reflexive type first introduced in *Dragon's Lair*. Enemies appear on the screen and if you're fast with your aim, they hit the dust. Too hesitant and it's a trip to Boot Hill for you. Very silly but fun nonetheless, particularly in the arcade with a crowd of mates rooting for you.

what went into Leland's decision," says David, "but I would imagine that the home market success of *Dragon's Lair* played into it." Interestingly, the trailer to *Time Warp* displays the note 'Licensed exclusively to Nintendo', yet Gary cannot recall the Japanese firm being involved.

ReadySoft converted the arcade sequel to home computers, and was once again forced to leave many scenes out. Some of these unused scenes were picked up and used in a new release confusingly titled *Dragon's Lair III: The Curse Of Mordread*. As with *Escape From Singe's Castle*, this 'third' title included some exclusive new scenes to help make sense of the story. David says: "We needed a new beginning and ending when we went back and made subsequent versions based on the same material, so we made our own. I suspect that technically we did need approval for this and I'm not sure if that was ever requested or received, but I do recall that the Bluth Group was quite hands-off at the time. Its interest was in feature movies and the *Dragon's Lair* rights were a sideline."

It would appear that Don and his partners weren't too protective of the rights if Elite's trio of *Dragon's Lair* games for Nintendo consoles are anything to

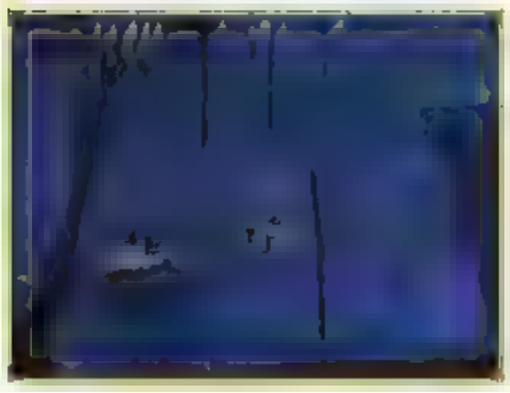
READERS REMEMBER

■ "I saw it in Porthcawl and there were always big queues around it. There were two guys who were always on it and could complete it on one credit and it was probably the best game ever to a young me. Because of that, I've got a weird fondness for *Dragon's Lair* and have picked up quite a lot of the home versions over the years. I actually quite like the SNES platformer the original GB version is a decent version of *Roller Coaster* and I also really enjoyed *Dragon's Lair 3D* (which is what the original game should have been and might have been if they'd had the technology at the time) on the PS2."

SHINOBI

ANOTHER WORLD

■ Eric Chahi's 16-bit classic has more in common with *Dragon's Lair* than you may at first think. How do you escape the tentacles at the beginning of the game? You push up. How do you reach the teleporter at the end of the game? You push left. In addition, both games dwell rather lovingly on death, and perversely it's often fun to get killed in a variety of ways just so you can witness the inventive fatality sequences.



BRAIN DEAD 13

■ Having spent a number of years successfully converting the *Dragon's Lair* games to home formats, ReadySoft put the ports on hold and developed this original interactive movie for home systems. Predictably the game borrows very heavily from *Dragon's Lair* with the usual button prompts advancing the story, but the quirky animation and delightfully dark plot help the game stand on its own two feet. Also, as a bonus, some of the death scenes are bleakly hilarious.

SHENMUE

■ It would be rather foolish to call Sega's *Shenmue* derivative outright, yet one of its key features – Quick-Time Events – can be traced directly back to *Dragon's Lair* and the other interactive movies of the era (via 1996's *Die Hard Arcade* which dabbled with timed button prompts during cutscenes). While *Shenmue*'s QTEs are just a small part of an innovative masterwork, some would argue that this 'feature' has been a blight on gaming ever since.

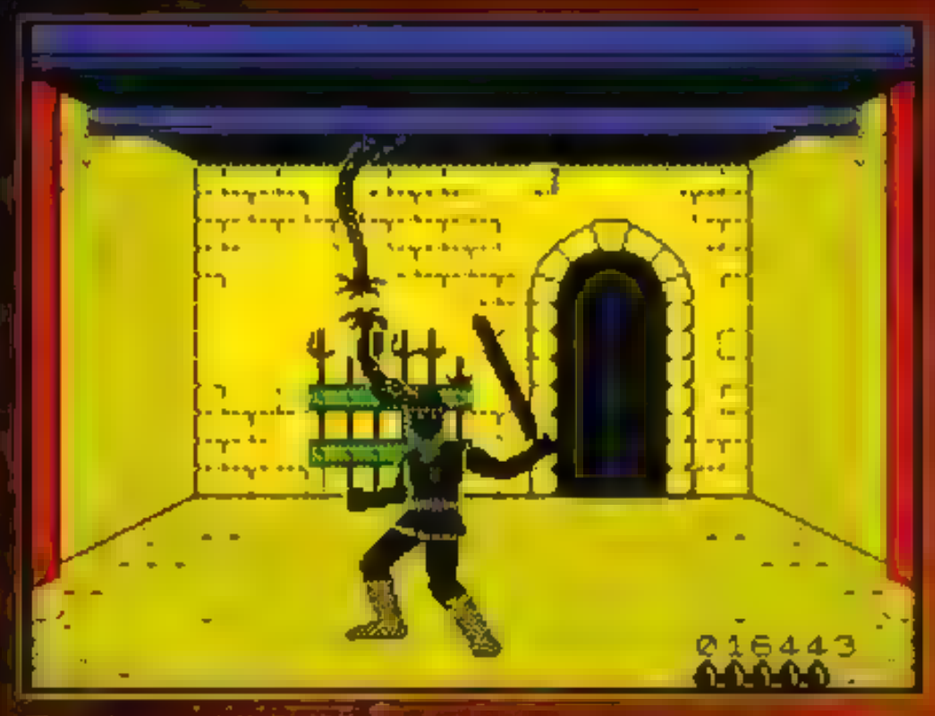
HEAVY RAIN

■ Beautiful, tragic, compelling, exhilarating. It's easy to go overboard with the adjectives when discussing *Heavy Rain*, the stunning noir-inspired PS3 game from Quantic Dream. What's really amazing though is that the game, in which the player has no direct control over characters and the action is affected by timed events, shouldn't really work in this day in age. Yet it does, brilliantly, as proved by the game's wide critical claim and strong commercial success.

go by. The NES (1990), Game Boy (1991) and SNES (1993) releases were all platform games far removed from the arcade original. Much more faithful were the CD-ROM versions which ReadySoft rolled out from 1993 onwards. These finally provided PC and Mac users, as well as owners of jazzy CD-equipped consoles like the Mega-CD, CDi and 3DO, with the closest thing yet to the full arcade experience at home (if you excused the slightly ropey Cinepak-era video quality).

In 1997, Digital Leisure (the new name for ReadySoft) released versions of *Dragon's Lair* with vastly improved video for CD and DVD. This year also saw the launch of Jeff Kinder's LaserDisc gaming website, which he initially created to document the restoration of a battered *Dragon's Lair* arcade machine that he'd bought. "I was so excited to finally be able to own one of my all-time favourite games," says Jeff about the machine. "Since the cabinet was in really bad shape, I figured I could rebuild the cabinet with new wood and restore it back to its original condition. As I worked on this project, I took pictures and put them on the internet to show others my progress. After a month or so, I started getting tens of emails from people commending my work and asking if I knew where they could find a *Dragon's Lair* machine or if I had any other information about the game or other LaserDisc games. Back in 1997 there was very little information about LaserDisc game on the internet, so I started doing research and making connections with people who had other games. Over a short period of time, many of these people started helping me and the popularity of the site really exploded."

Dragon's Lair was very much a product of the Eighties, yet its mysterious indefinable showed no sign of waning with the arrival of the new millennium. In



READERS REMEMBER

■ "One of the video rental shops in town had a bunch of arcade machines, and one day I was there I saw this amazing game people were crowding around. It was truly a thing of beauty and dearly want that *Dragon's Lair* him to happen."

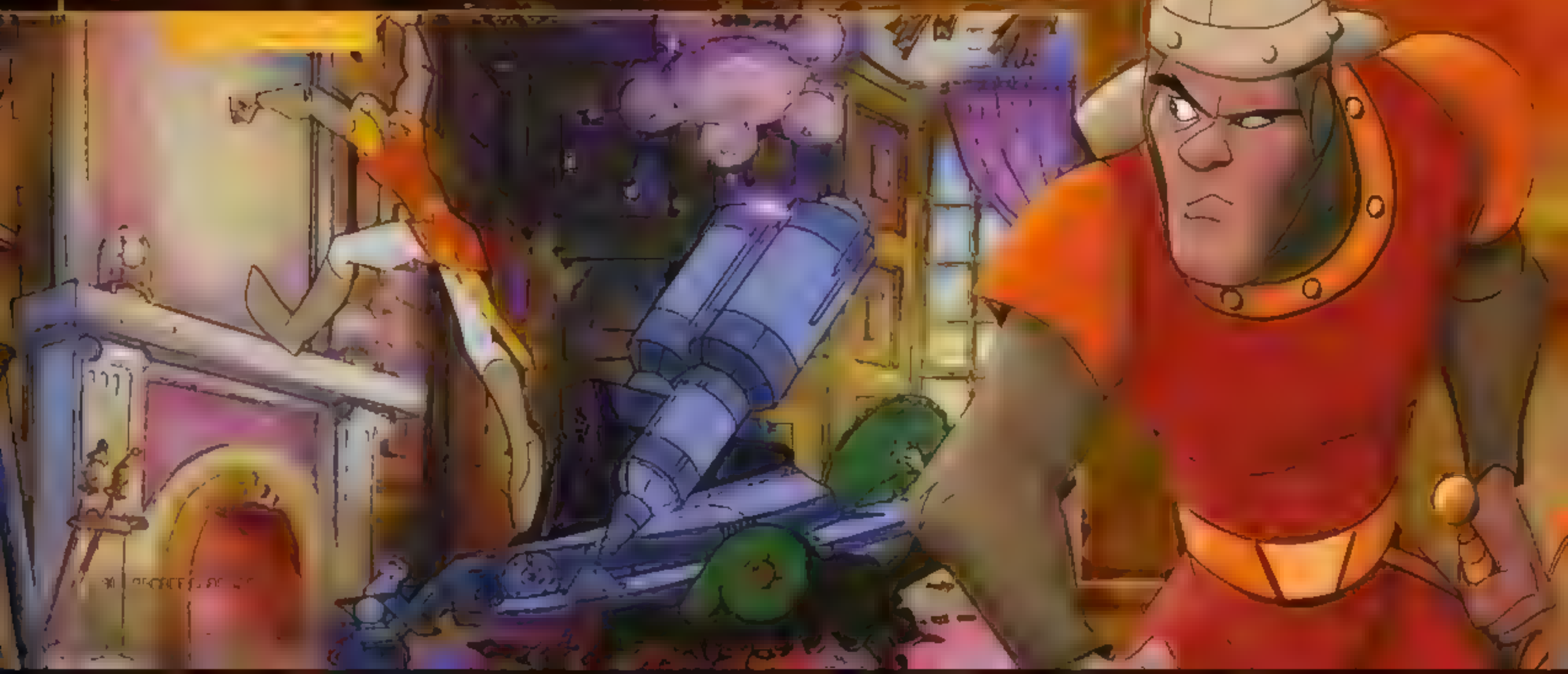
NORTHWAY

2001, Capcom published a surprisingly faithful version for the Game Boy Color and then in 2002 Ubisoft readied an all-new Dirk adventure for PC and home consoles. Titled *Dragon's Lair 3D*, the gameplay was updated to give players direct control over Dirk, while the distinctive look of the original was replicated.

"We used source material from the original *Dragon's Lair* to help us apply the look to the 3D version," says project director and lead animator Thomas Konkol. "We were very lucky to have access to the original backgrounds and some animation cells." These were provided by the original co-creators who had a hand in the development. "They were very helpful in providing original art assets, giving us creative art direction, and on occasion, visiting the studio to assist and answer questions. I remember Don Bluth came by my office and looked at the 3D Daphne model I was creating and gave me very helpful advice on how to adjust her proportions to make the model look more like the 2D animated version."

In 2006 the focus returned to the original game with the first HD release from Digital Leisure. This proved to be painstaking work for David Foster and his team. He says: "We went back to the original film that had been in a vault for 20 years and had it transferred to a digital format in

"THERE WERE AT LEAST 10 OR 100 PLAYERS SCRAMBLING IN LINE WAITING TO PLAY IT. IT WAS LIKE THE LINES TO SEE SANTA AT THE LOCAL ARK



HD. Although it was great resolution it showed up all kinds of dust, hair and other artefacts that weren't particularly visible in SD but were glaring in HD. So we ended up spending six month doing hand touch up on a frame-by-frame basis to tidy up the video, but we ultimately had a much cleaner version which looked great in HD."

This HD print has been used in subsequent releases for many platforms including Wii, PlayStation 3, Xbox 360, iOS and Android. So what next for the original *Dragon's Lair*? A 3D version? A 4K version?

"We always have *Dragon's Lair* plans in the pipeline," says David. "However we're sticking with the core game. We've discovered that this is what fans want the most. If a *Dragon's Lair* feature film were ever produced then there might be interest in a movie-[illegible]version of the game."

Talk of a *Dragon's Lair* movie has [illegible] for many years. Over to Gary Goldman: "It's still on our list of feature films we want to make. We've probably done twelve rewrites on the script. It isn't about the game. It's the backstory about Dirk, Daphne, their history. It's a prequel to the game!

READERS REMEMBER

■ "I saw a massive crowd around a machine, and once I fought my way to the front I saw the most spectacular game I'd ever seen! Literally a cartoon! If only it wasn't so ruthlessly difficult I'd have played it. I also think it was the first ever game that cost 50p a credit. Shocking in the days of 10p machines!"

FREESTYLER

The polarising effect of *Dragon's Lair* might be the reason why a question mark hangs over the movie. But then, even those that hate the game and wish they'd never wasted a single credit on it must surely appreciate its groundbreaking impact and admire its 32 year legacy.

"It's the animation," says Gary, when asked about the game's timeless appeal. "It's well executed and still entertaining even to the children of those who played it during the Eighties. It's not a great game, it's a memory game. I think the phenomenon is that it was a historic and memorable moment in the lives of those who saw it when it first appeared in the arcades. It's one of those first game experiences that takes place at an impressionable age, like going to see your first animated film in a theatre. It scars the brain and you remember it forever, especially if you were entertained by it and everyone your age was talking about it.

"We know that there are still plenty of fans out there. We continue to receive mail from fans expressing their gratitude and inspiration to seek a career in animation. That's pretty amazing."

INSIDE THE DRAGON'S LAIR

We chat to director Martin Touhey about his upcoming Dragon's Lair documentary

Why did you decide to document *Dragon's Lair*?

Dragon's Lair had a significant impact on my life. It's stuck with me like glue for decades. I felt that by having a subject that I was personally attached to would benefit a documentary. Not only was *Dragon's Lair* a personal favourite of mine, but it was also a very interesting subject to tackle. There are very few games out there that have had the same kind of longevity. *Dragon's Lair* was also a game that had many 'firsts'. The animat on angle alone was really enough to warrant a documentary about the game.

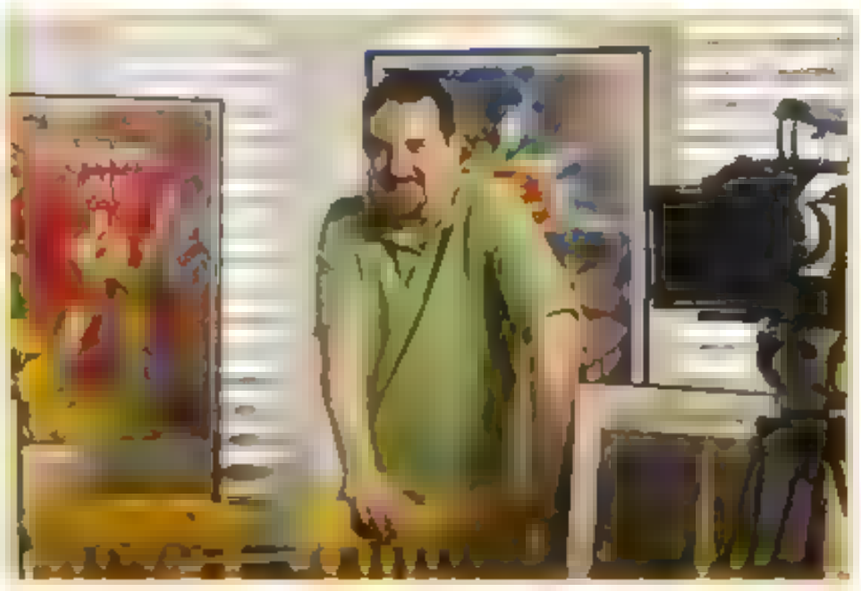
How is the project progressing?

The project is coming along quite nicely. We've interviewed about 20 people so far including animators Don Bluth and Gary Goldman. We're still in production and will be launching a Kickstarter campaign to help with the additional production costs as well as post-production. As it stands right now the release date of the film is up in the air, but we're shooting for the first part of 2014.

The various home releases over the years have included documentaries and interviews with the creators. Why should fans check out your documentary?

I've seen the mini-docs and interviews, but what I find missing from them is a solid compelling narrative. We want to create a film that tells a story that everyone can appreciate and enjoy, not just *Dragon's Lair* fans. It's all about creating a film with a narrative and if you have all the right elements in place and they're hitting on all cylinders then you'll end up with a film that's greater than the sum of its parts. So far all I've seen out there is parts.

You can follow the documentary's progress on Twitter (@dragonslairdoc) and Facebook (facebook.com/dragonslairdoc).



» Documentary director Martin Touhey, at Don Bluth's house (photo by Justin Maine)

SLAP FIGHT

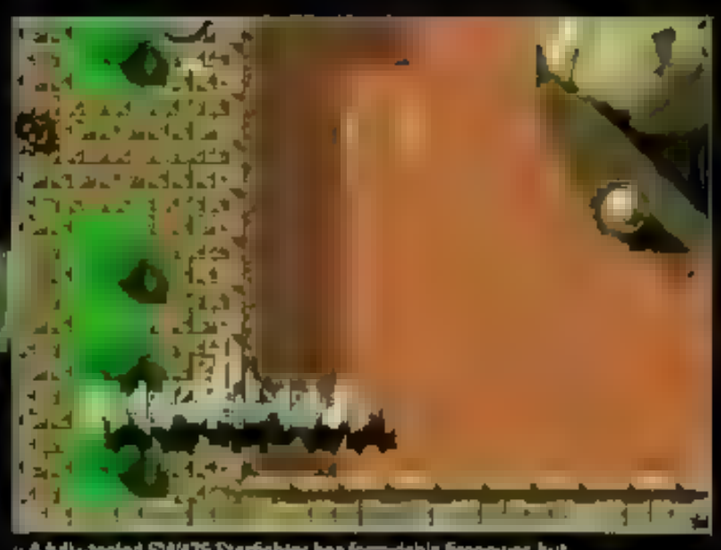
Toaplan's early shooter might not have been the most original game of all time, but that didn't mean it wasn't worth playing. Darran Jones has an itchy trigger finger...

If you were a gamer in the Seventies and Eighties, the arcade was your temple. While the home computer markets were booming, gamers religiously flocked to local arcades because the games found there offered state-of-the-art aesthetics that didn't exist anywhere else. Granted, gameplay innovations were being made in the home and across a wide variety of genres, too, but it was mainly in the arcades where most of the advancements for racing, fighting and shoot-'em-up titles were being made.

Not every game became a success by creating something completely new, though. Indeed, some titles simply built on the mechanics of existing games and added their own unique ideas to them. *Slap Fight* easily falls into this category, and while it leans heavily on a number of prominent arcade shooters, it's still very much its own game, and a bloody good one at that.

Slap Fight was first released in 1986 by legendary shoot-'em-up developer, Toaplan. The company was no stranger to the genre, having already dabbled with the likes of *Perfoman* and the excellent *Tiger Heli*, but *Slap Fight* saw the developer come of age. *Slap Fight* was clearly influenced by Namco's *Xevious*, a fact that was made obvious by its vertical-scrolling setup and similar-looking visuals, but Namco's shooter wasn't its only influence. Toaplan's shooter was also indebted to Konami's *Gradius*. In fact, it's one of the few games that we can think of that apes *Gradius*' clever systems, proving that, outside of Konami's own franchise, the mechanic wasn't as influential as many think.

Shooting certain enemies in *Slap Fight* produced stars, which, when collected, would highlight different menus on an eight-tier power-up bar. Selecting Speed would increase the manoeuvrability of your ship and could be upgraded five times (although it's worth noting that you'll need the reflexes of a Jedi to successful manage your SW475 Starfighter on the highest settings). Side-Shot allowed you to take out enemies on your flanks, which became very useful at certain points of the game, while Shot was your default weapon that was fast to fire but had limited range. *Slap Fight*'s best power-ups were the add-ons that bolted onto ▶



A fully-loaded SW475 Starfighter has formidable firepower, but

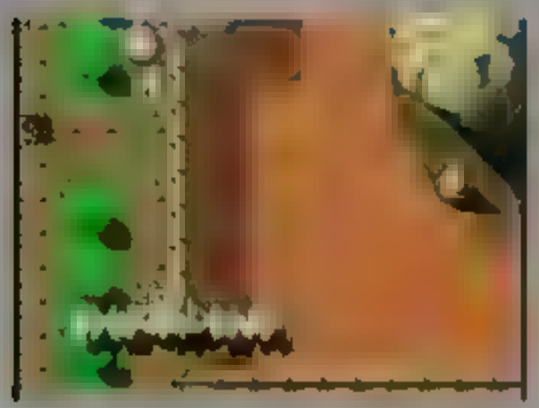
SPACE CHARIOT
ARMOURED UNIT
PIXEL PERFECT
G TO DO
ALIEN DRONE
EXPLOSION
EIGHT-WAY DRONE
ARMOURED TANK
ENEMY CRATER
POWER-UP
HOMING MISSILE TARGET
GUN EMPLACEMENT
FULLY-ARMOURED SW475 STARFIGHTER

"Looking back, I wished we had used more colour but it didn't fit well with the slow smooth movement"

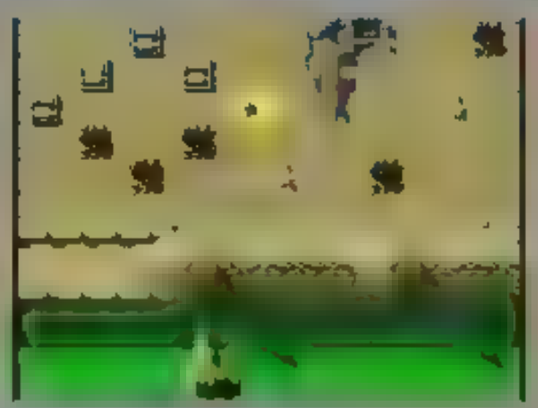
BUILDING A BETTER STARFIGHTER

Slap Fight's power-ups explained

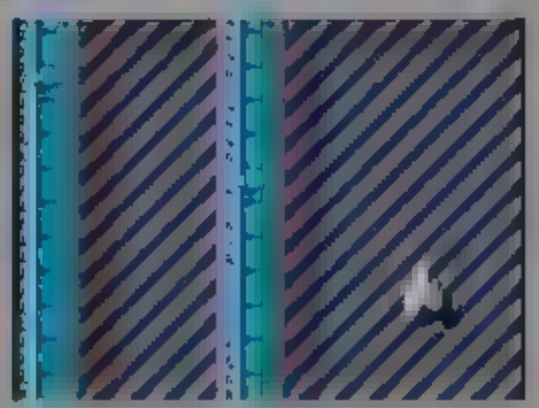
SURVIVING SLAP FIGHT



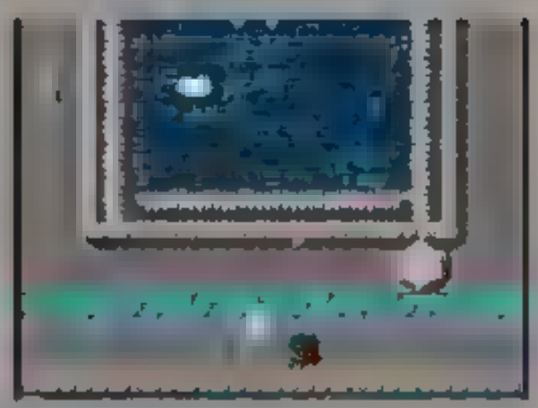
SNEAKY POWER-UP



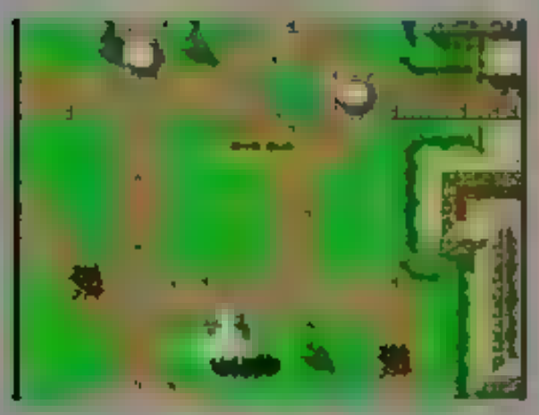
BRUCIE BONUS



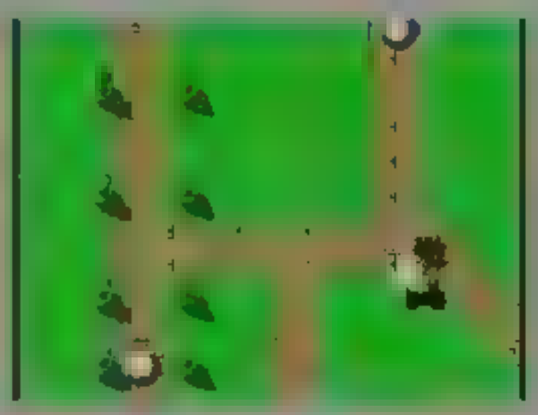
LET THEM GROW



ROLLING START

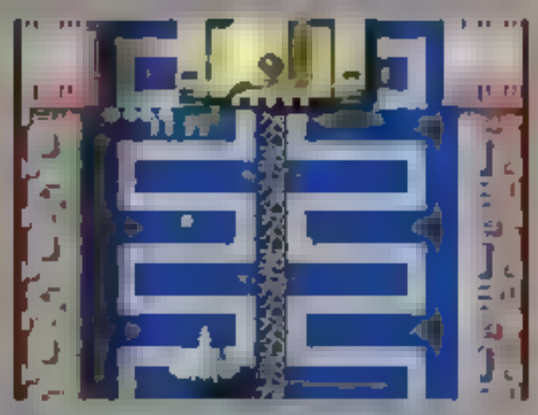


STAR POWER



BEWARE SNEAK ATTACKS

DON'T GET GREEDY



WATCH THE PATTERNS

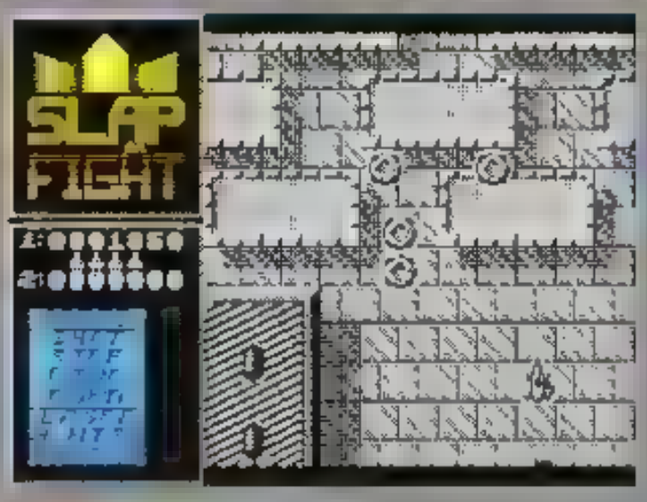
your ship, physically changing both its appearance and size. Wing would typically improve the power or speed of an equipped weapon but made your ship a bigger target. It could be upgraded three times, saving your ship should one of the sets of wings take a stray hit (a direct hit will still kill you, though). Bomb was a slow attack that had a short range but delivered a devastating strike, while Laser was desirable due to its high firing-rate and tremendous range. Homing Missiles required seven stars to activate, but it delivered exceptional firing power due to being able to fire off up to 16 guided missiles at once, while Shield provided much-needed invulnerability for either three hits or 25 seconds, whichever happened first.

While upgradeable weapons had featured in *Gradius*, *Slap Fight*'s handling of them was quite different. Unlike the Vic Viper, which stayed constant regardless of what new weapons it sported, the SW475 Starfighter would change in both size and shape as more power-ups were bolted onto it. This created an interesting risk vs. reward mechanic as while the addition of new power-ups ensured you could deal out an insane amount of destruction, it also made you a far easier target. Adding power-ups, like Wing, would make short work of your opponents but it also meant that only skilled players could keep the upgraded ship in play for a decent length of time. It's a neat system, although it shows that *Slap Fight* could be very harsh at times.

Arcade games were well known for being designed to part players from their hard-earned cash and *Slap Fight* was no exception. It could be tough at times as enemies never missed an opportunity to fire at you and would often do it at short range, making it extremely hard to avoid some attacks. Oh, and they were sneaky buggers, too, often approaching from the bottom of the screen. In a further slap to the face there was absolutely no way to continue, meaning most players would only see everything *Slap Fight* had to offer if they cheated using save states on an emulator. The sheer ferocity of *Slap Fight* meant you were constantly kept on your toes, as it required you to play with your utmost concentration so you don't get hit by something you shouldn't. Too be honest, though, we actually like this approach. Even though *Slap Fight* was difficult, like many similar shooters, it was never unfair in the way it dished out punishment. Enemy attack waves were fairly slow and cleverly integrated into the landscapes. The vast majority of *Slap Fight*'s enemies were not in ships, meaning they attacked from set pathways. It became obvious ▶

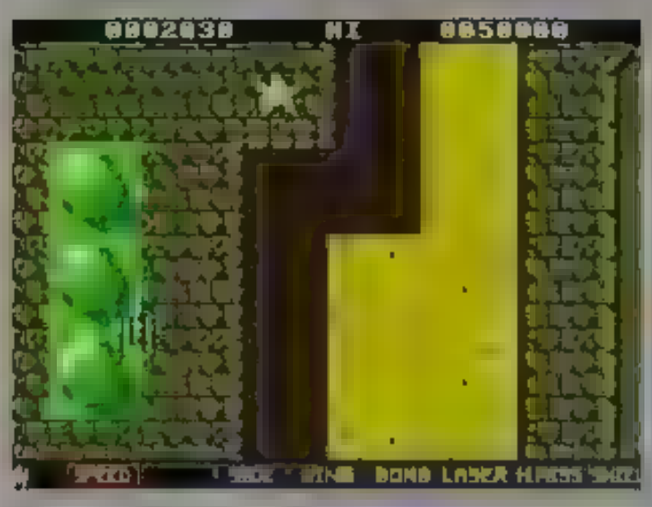
Slap Fight doesn't feature a large number of bosses, but each and every one will test your mettle.

CONVERSION CAPERS

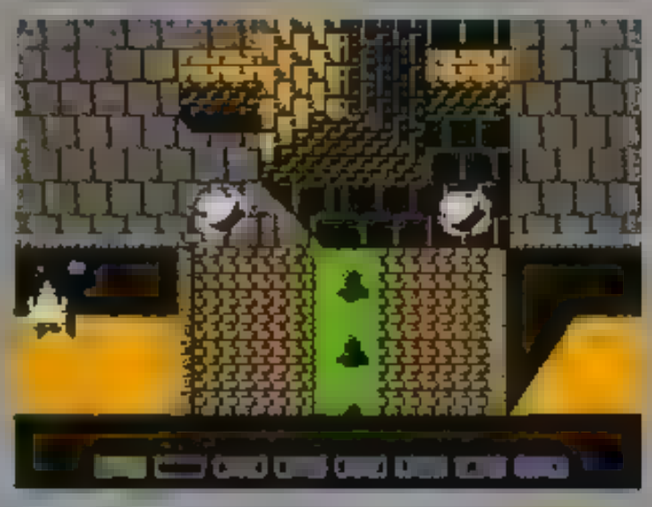


ZX SPECTRUM

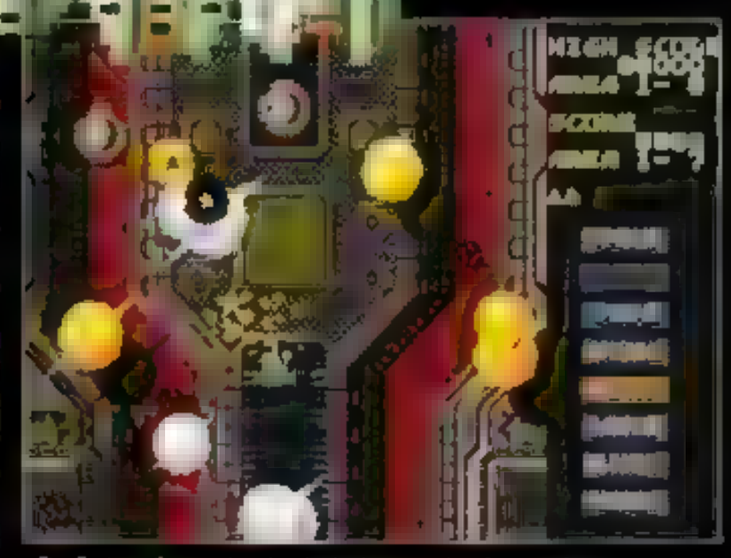
AMSTRAD CPC



ATARI ST



COMMODORE 64



The Typhoon Bomber is unleashed, taking out virtually everything on the screen. Boom!

▶ when certain areas would be safe because there would be no way for an enemy to bypass whatever was on the ground and it gave *Slap Fight* a nice organic feel that other shooters lacked.

Slap Fight actually had a story to complement its relentless shooting, and while it's slight, it did explain where its alternative name, *Alcon*, originated. Set in the year 2059, mankind had mastered space travel and had colonised the planet Theon after aliens caused them to flee the planet Orac. Theon is now under attack, so the humans fought back using an Allied League Of Cosmic Nations fighter pilot to take the fight to those pesky aliens. Granted, it's not the greatest tale, but we'd imagine something got lost in the translation when it made the jump to the West.

Slap Fight's success meant it was a shoo-in for a home conversion and it ended up on several systems. Ocean secured the game for its Imagine label and had numerous developers working on its various ports. The Amstrad and ZX Spectrum conversions were handled by Probe, the C64 effort was created in-house by coder John Meegan, while Abersoft Ltd. coded the Atari ST version. France Image Logical also created some ports of *Slap Fight* for the Thompson MO5 and TO7. Interestingly, only one console version was released, but it was a cracker. A collaboration between both Toaplan and MNM Software for the Mega Drive, it's not only the best home port, but also features a brand-new mode. Sadly, a small print run means you'll now have little change from £300 if buying it today.

Slap Fight may have packed a challenge, but it was also packed with great ideas, strong level design and plenty of satisfying boss fights. It's a testament to Toaplan's game design, that it still delivers a fun challenge some 30 years later. ★

MEGA DRIVE

"I loved shooters back then, but I wasn't good at playing them"

A CHAT WITH NICK BRUTY

The Spectrum graphic artist gets back in the Slap Fight cockpit

How did you end up working on the game?

Probe Software got the contract and I was one of their few artists knocking around at the time. I worked on most of Probe's Spectrum games.

Had you played much of *Slap Fight*?

Yes, I had played it in the arcades and was excited to work on it. We got [the] arcade game delivered to the office. When I say 'arcade', I mean the board in a briefcase! You can imagine how much playtime that received.

How hard was it to replicate the distinctive-looking visuals of the arcade original?

It was a very simple job once the decision was made to stay mostly monochromatic. Looking back, I wished we had used more colour but it didn't fit well with the slow, smooth movement. If it was a fast-paced game I would have pushed for more colour use.

Were you a fan of *Slap Fight*'s weapon system?

Yes, I loved scrolling shooters back then, but I wasn't particularly good at playing them. The weapon system helped me look like a better player. I had just converted *Xevious*, so it was a nice upgrade to then go in *Slap Fight*.

What help did you get from Taito?

I never had any contact with the publisher, which was typical when working with Probe, but the game was very straightforward to port. There just weren't many options on which way to take it. Plus Dominic [Woods] already had an existing scrolling shooter engine so everything was understood from the outset.

What difficulties did you encounter with Spectrum ports?

A lot of times you weren't supplied with maps or tools to look at the arcades data and art. You just had to play through the game time and time again to map it out. Most arcade games were smooth scrolling so there was always that headache. Smooth scrolling vertically was much easier than horizontally. Thankfully this was vertical but Dominic and I had to tackle horizontal later with *Metro-Cross*.

How do you think the Spectrum port holds up compared to the arcade original?

Dominic did a great job maintaining the frame-rate for the smooth scrolling to pay off, so the trade-off for colour was worth it. You never get all the time you would like to make the perfect port but having the tech in place saved a lot of development time, resulting in a more polished game.

THE UNCONVERTED

Arcade games that never made it home

MACH BREAKERS

■ **Developer:** Namco ■ **Year:** 1994 ■ **Genre:** Sports

By the mid-Nineties, regular athletics games were no longer enough for gamers – or at least, that was Namco's perspective. Eschewing the charms of real-world athletes like Daley Thompson, *Numan Athletics* was a cult hit featuring superhuman athletes. Namco was pleased enough with its performance that it quickly put a sequel into production, and *Mach Breakers* arrived the next year.

Mach Breakers offers players a choice of seven extraordinary individuals with ordinary names, like the American all-rounder Johnny and the Japanese speedster Makoto. They're pitted against each other in a variety of events, and while the opening sprint is just extraordinarily fast, things quickly turn bizarre. There's no 110-metre hurdles event here – instead your chosen superhuman needs to kick their way through thick walls of ice. Even stranger events await, from monster-hauling to missile-chucking, and even miniature shoot-'em-up sections that resemble a light version of Atari's classic *Tempest*.

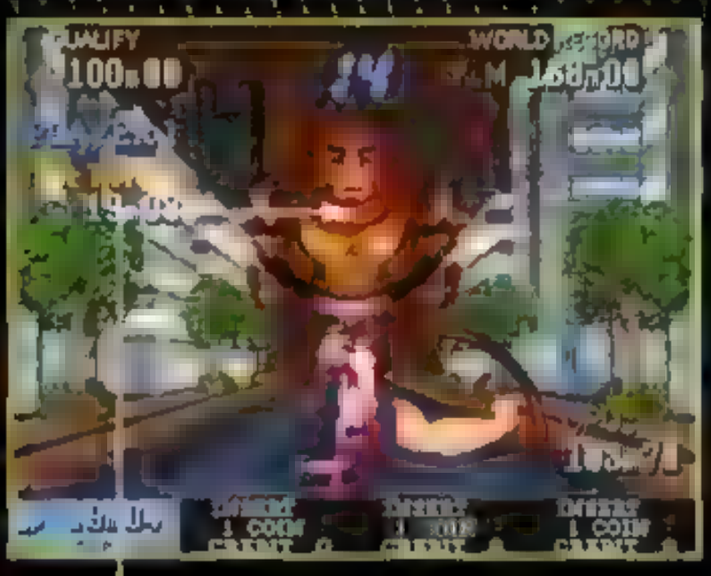
It's a rather excellent multiplayer game, with up to four players able to join in and simple controls to allow even first-timers a fair chance of success. This is aided by the game's structural improvements over the original *Numan Athletics* – events are now easier to pass and players are offered a choice of events after the initial sprint is complete. The game is visually appealing too, with the kind of gigantic sprites and scaling effects that had become commonplace in 2D games by the mid-Nineties. In fact, much of the game's appeal lies in the sense of humour conveyed by the visuals, as it conjures up some ridiculous sights. Our favourite is the Godzilla stomp that follows a failed monster-hauling session.

It's not hard to see why *Mach Breakers* didn't make it home, as it's one of those titles which clearly illustrates the differing expectations of the home and arcade markets – there's simply not enough content here to justify a home release, especially given the multitude of conversions that would have been needed in the generational transition of the mid-Nineties. It's a multiplayer classic that is at its best when swallowing coins, and we're glad that Namco recognised that.

CONVERTED ALTERNATIVE

NUMAN ATHLETICS 1993

Mach Breaker's predecessor *Numan Athletics* is similarly awesome and features events including train-pushing and building-jumping. If you're looking to pick up the home release though, you might be in for a bit of a struggle – it was released exclusively in Japan.



» Hauling a Godzilla-style monster along is one of the most impressive sites the game has to offer, but it's no pushover – precise timing is needed to succeed.

» There's no joystick usage at all in *Mach Breakers* – every action takes place across the three buttons, with those on the left and right filling in for directions.

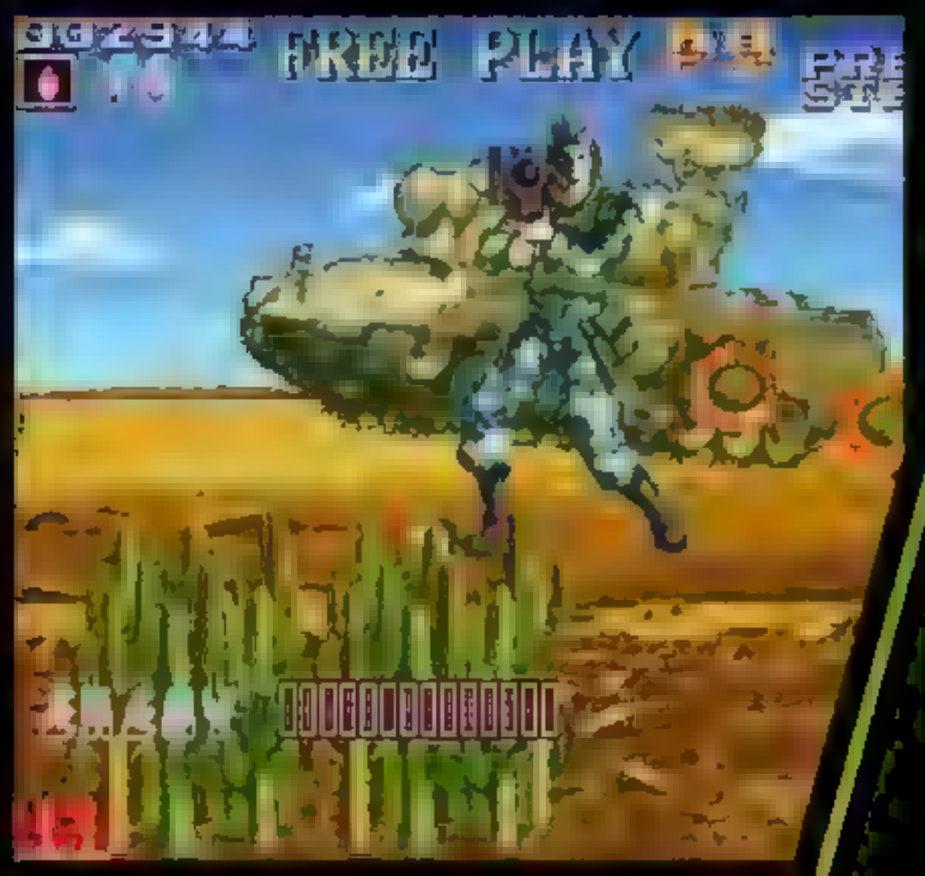
» Characters are varied and play uniquely, with participants rated on their performance in speed and strength. Choose

» It's clear that the athletes in *Mach Breakers* are more than just human, with manga-style superhero flourishes accompanying many of the most impressive in-game moments.

BEST LEFT IN THE ARCADE

LORD OF GUN

■ Developer: IGS ■ Year: 1994 ■ Genre: Lightgun shoot-'em-up



■ *Lord Of Gun* aims to offer variety to players, with each stage offering a different setting and new weaponry. However, almost every aspect of the game is laughably bad. The visuals are awful, featuring unattractive sprites with some of the most atrocious animations to have appeared in a Nineties arcade game. This would be forgivable if the game played well, but there is no semblance of a difficulty curve on show. Hostages are often identical to enemies, meaning that players will be relying on shouts of "I'm a hostage" to identify them – always a solid design choice in noisy arcades.

While *Virtua Cop* arrived in the same year as *Lord Of Gun*, it's a little unfair to draw a comparison between the two – they were developed for very different markets by companies in wildly different positions. However, it's harder to forgive the fact that *Lord Of Gun* struggles in comparison with *Operation Wolf*, a game released seven years earlier. By failing to recognise the advances made in the intervening years by games like *Alien 3: The Gun* and *Steel Gunner*, IGS doomed *Lord Of Gun* to irrelevance. Thankfully, the developer left the genre alone entirely in the following years.

HOT SHOCKER

■ Developer: E G Felaco ■ Year: 1982 ■ Genre: Maze

Each stage has a distinct colour scheme, including one with an invisible web.

■ *Hot Shocker* is one of the stranger releases of the early arcade market. The game resembles Konami's early release *Amidar*, but has moved from a grid format to an octagonal maze that resembles a spider's web. You're tasked with avoiding enemies, while visiting every part of the maze with wire in order to connect phone lines and move onto the next level. Most of them move around the web and only serve to slow you down in order for the more lethal enemies to catch up to you, but a lightbulb appearing at the fringes will zap careless players.

The main addition to the *Amidar* formula is that of a power-up, which gives your hero a temporary boost in the form of speed and invincibility. It resembles an enemy with different colouring though, so it's easy to miss. *Hot Shocker*'s failure to leave the arcade is easy enough to explain – as the only game manufactured by E G Felaco and a pretty derivative one, there was no mileage in licensing the game for home systems. And if you were a clone programmer, was there any sense in skipping the innovator to clone the imitator? No, there was not.

CONVERTED ALTERNATIVE

AMIDAR 1981

Amidar was the obvious inspiration for *Hot Shocker*, and is easily the more famous game. Konami's game was only converted to the Atari 2600 officially, but a large number of unofficial clones exist for a variety of formats including *Cuthbert Goes Walkabout*, *Traxx*, *Crazy Tracer* and *Crazy Painter*.

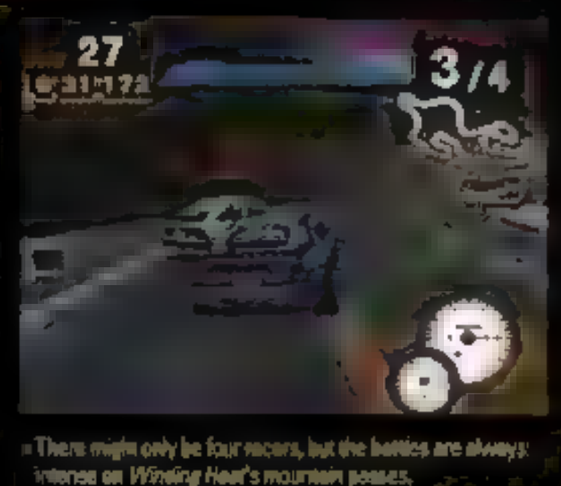
CONVERTED ALTERNATIVE

MIDNIGHT RUN 1995

As we mentioned, *Winding Heat*'s predecessor did manage to make it home. A PlayStation version was released in 1997, exclusively in Japan. Be warned, though – before you rush to import it, know that the conversion is no classic, thanks to some jerky visuals and sloppy handling.

WINDING HEAT

■ Developer: Konami ■ Year: 1996 ■ Genre: Racing



There might only be four racers, but the battles are always intense on *Winding Heat*'s mountain passes.

■ Konami certainly waited a long time to follow up on *Road Fighter* – despite making its debut in 1984, a sequel didn't appear until the mid-Nineties. Luckily for fans of that sequel, the 1995 release *Midnight Run*, a new game was much quicker to arrive as Konami released *Winding Heat* just a year later.

Winding Heat offers a surprisingly large number of cars, with 14 available – each of which also has multiple tuning options. The excess continues in the on-track action, as while only four drivers take part in each race, they've got to contend with heavy traffic as the races take place on public roads, which bring to mind the mountain passes of the *Initial D* series. Races are fun and frantic thanks to some track design that holds up well, but the handling is disconcertingly loose.

With market preferences shifting towards more realistic racers like *Gran Turismo*, arcade racing games were having a hard time attracting attention in the console market. It's likely that *Winding Heat* didn't make it home for that reason – its predecessor, which did manage to reach the PlayStation in 1997, never gained much of a reputation.

THE STORY OF STRIDER®

When Capcom released Strider in 1989, little did it know that it was creating an iconic, enduring franchise. Darran Jones swings his Cypher and speaks to key staff behind the series

It's been 28 years since Strider Hiryu first swung his Cypher sword and made that dizzying run down an exploding mountainside that captivated all who saw it. Since then he's been something of a recluse, using his ninja skills to hide in the shadows and only occasionally coming out to shine, but otherwise content to simply cameo in a number of other Capcom games particularly versus fighters where his insane ninja skills are put to extremely good use.

To celebrate his 25th anniversary Capcom unleashed a brand new game, *Strider* which aimed to appeal to the original fanbase, as well as a brand new generation of gamers. It's actually a highly enjoyable game, even if it's not quite as good as the 1989 original.

"I have never felt that *Strider* became successful," reveals original creator Kouichi 'Isuke' Yotsui, when we ask him about the popularity of the ninja he helped create in 1989. "However, while we were making *Strider*, we always felt that we were in middle of creating a very entertaining game."

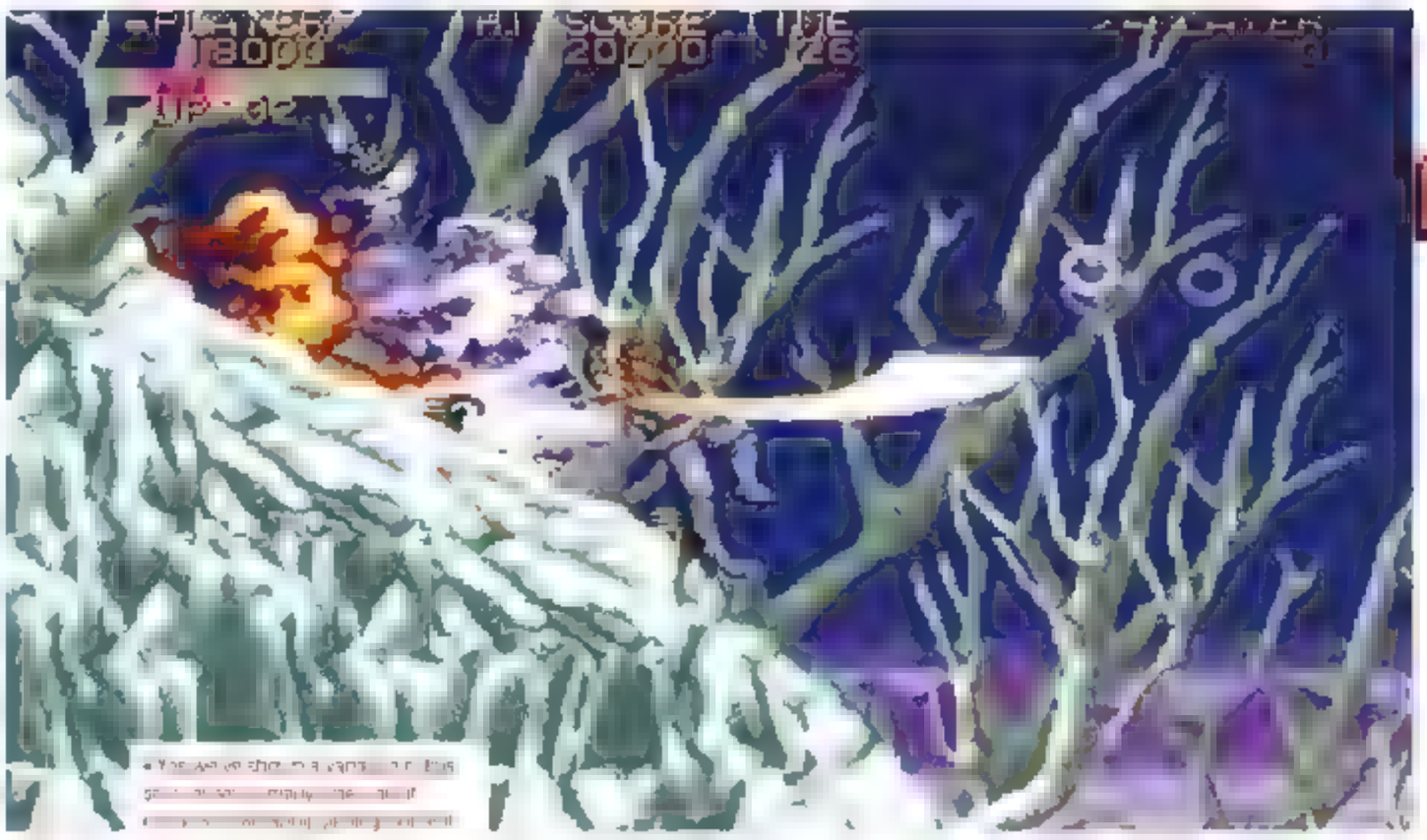
He's right as well. *Strider* is an incredibly enjoyable game, one that pushed graphical boundaries when it was first released. Taking on the role of Strider Hiryu, your aim was to bring down the evil dictator Grandmaster Meio, armed with just your Cypher laser sword and your insane agility. Hiryu could swing up gantries, run down ▶

THE STORY OF STRIDER

"We always felt that we were in middle of creating a very entertaining game"

Kibuchi Yoshiki

STRIDER



"We had trouble keeping the amount of data under what was available"

▶ mountainsides, leap huge chasms and even operate in zero gravity. He was quite simply magnificent, but he also caused issues for Yotsui, who struggled with the technology limitations of the time. "We had trouble keeping the amount of data under what was available," he admits. Hiryu's various action movement data had taken up more than half of the whole graphic data amount space.

And yet many would argue that it's worth it. Watching Hiryu in motion as he climbed walls, sliced his way through enemies and nimbly avoided enemies was mesmerising, and it's pleasing to see that new developer Double Helix Games has managed to retain his deadly grace for its reboot. As far as Yotsui was concerned, Strider's graceful animation was always the thing that drove his game. "It was the most important thing," he explains to us. "This is an action game, therefore the player should be able to enjoy it by just controlling Hiryu. We tried to make players be entertained by just making Hiryu run, jump or go through unknown environments. By adding movement such as jumping, running, sliding, clinging and climbing it will be even more entertaining. We felt that defeating unexpected enemies that appear in front of you by using all those movements would give the players extreme pleasure. To enable all these cornerstones, Hiryu's agility had to be the most important [thing] of all."

In addition to Hiryu's impressive athleticism, it was the game world itself and its weird and wonderful bosses that really helped separate it from its arcade peers. *Strider* had dramatic set pieces that ranged from running down an exploding mountainside to hitching rides on the backs of various dinosaurs, while his travels took him from the snowy slopes of Sibena to the heart of a floating battleship. Variety was the spice of life in *Strider* and this was none more apparent than when facing off against its insanely nutty bosses. "We created multi-cultural and unfamiliar looking enemies to surprise players," continues Yotsui when quizzed about *Strider*'s exotic art design. "Creating these enemies was also important to expand the world within the game."

And what magnificent creations those enemies were. Robotic gorillas, brash Amazonians, metallic dinosaurs and an airborne pirate all vied for your attention, while even the lowliest of enemies felt alien and unique. You never forget the time you flew around the anti-gravity boss, desperately pummelling the fire button before you're flung into a nearby wall, or watching a group of Russian dignitaries transform into the hammer and sickle-wielding Ouroboros. It's a testament to their timeless design that so many have been included in Double Helix Games's reboot, but which is Yotsui's favourite? "I like the visual style of Lago Mechanic, the abilities of Anti-Gravity Device, Mecha Pon's charm and the clever functions which Ouroboros has," he tells us, clearly warming to the subject. "I like Solo's coolness, Kunlang MA Team's beauty and the dignity which Grandmaster Meio has. Yes, it's safe to say I like all of them."

THE MISSING STRIDER

The game that Grin was making

It's widely known that Capcom had commissioned Grin to make a game about Strider as far back as 2008. What isn't known is what type of game it was going to be. After extensive digging an anonymous source was able to confirm a few things about the title.

"Grin made the deal with *Strider* overlapping *Bionic Commando* before anyone knew how *Bionic Commando* would be received. At that time I think that relations with Capcom were good. I guess they started to outline a new project thinking *Bionic Commando* would be a hit." We've thought this ever since Grin was revealed as the developer, as *Strider* would have fit perfectly into its two-game template.

Our source goes on to reveal the following about *Strider*'s gameplay. "It took many different turns. First we did a super abstract design that was completely unique. That was the first take. Then the project landed in the hands of Grin Barcelona. From that point I have absolutely no idea."

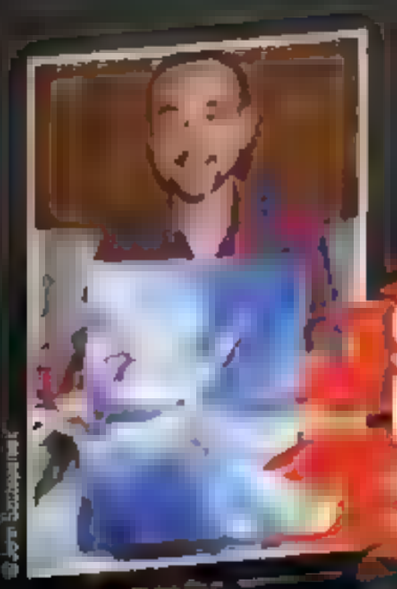
Capcom went on to approach Grin with other smaller titles, including mentioning *Mega Man*, but the ideas were eventually dropped, the *Bionic Commando Rearmed* team was separated and Grin itself closed down a year later.

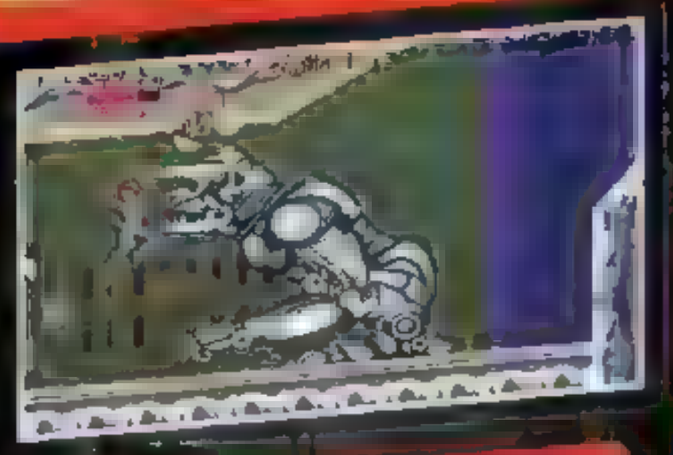
Gamers agreed, and *Strider* became a big success for Capcom, no doubt helped by the Manga comic that had been released in 1988 (in collaboration with Moto Kikaida) and the 1989 NES game that followed a few months after Yotsui's arcade game. The NES game is quite interesting because it's a completely different beast to Yotsui's effort, playing to the strengths of the host hardware but clearly losing out as a result.

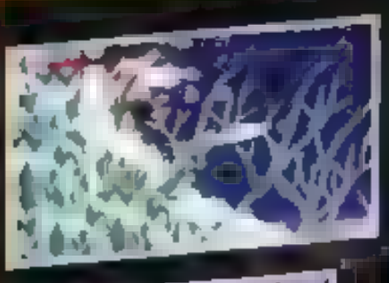
You still play as Strider Hiryu, but the pace of the game is greatly diminished, making him feel slightly less effective as a result. The story is also different to the arcade game, and a little more detailed due to the nature of the platform it's on, making it more in line with the story told in Tatsumi Wada's original manga anthology. There are Metroidvania-like design aspects to the game as well, with the ability to return to previous levels once new power-ups have been acquired. While it's a fun addition to the *Strider* canon, it lacks the grace and fluidity of Yotsui's ▶

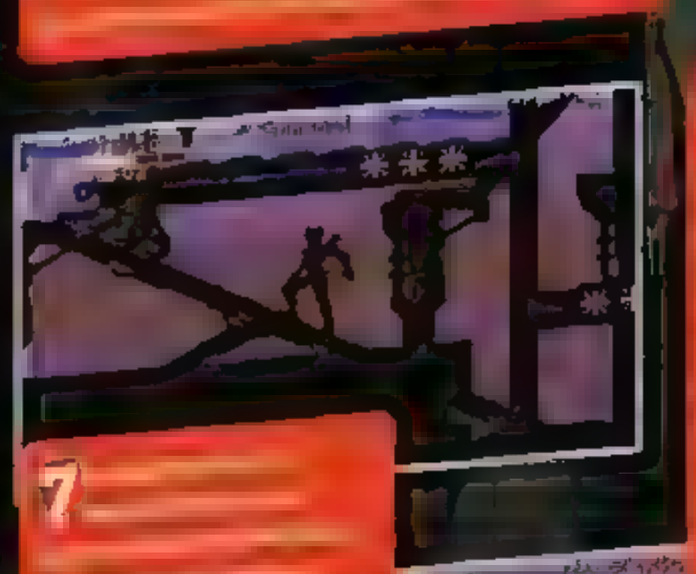
STRIDER: THE DIRECTOR'S COMMENTARY

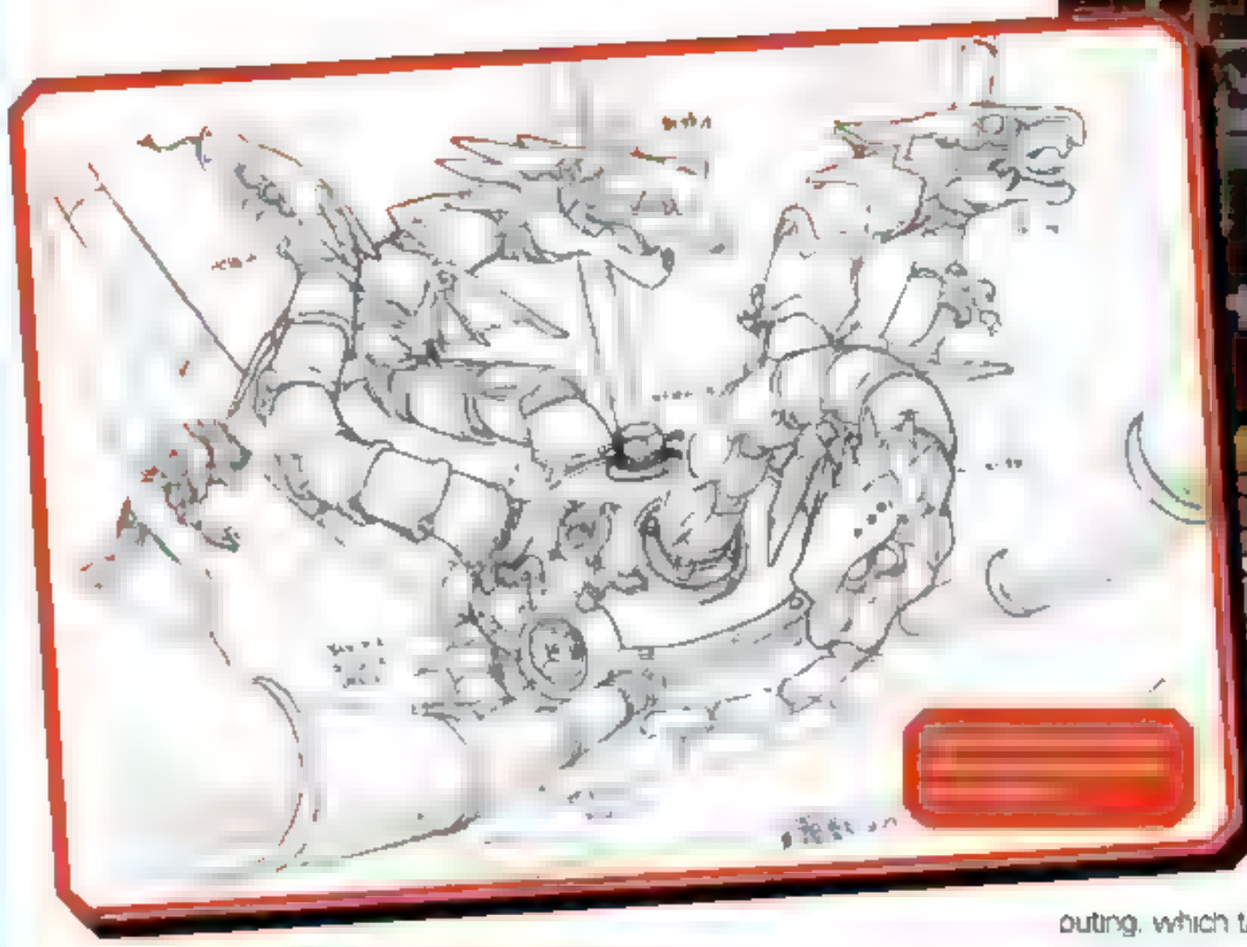
Kouichi Iroguti tells us the story and gameplay mechanics behind Strider's iconic second level











game, a thing that becomes far more noticeable when using wall jumps or climbing. You never feel quite as in control of Hiryu as you do in the arcade outing, which takes away from the game. It's still a robust action game – something Capcom could turn out in its sleep during its NES period – but it pales in comparison to Yotsui's interpretation of the ninja.

Home conversions of the arcade game soon followed, with the majority of home computer versions being handled by US Gold, which passed coding duties to Tiertex. Sega did its own conversion of *Strider* for its Mega Drive and Master System, while the long-gestating PC Engine game (it was first announced in 1990 but released in 1994) featured animated cut-scenes, Red Book audio and a brand new level. Tiertex's conversions were hit and miss for the most part, with its 16-bit conversions faring better although it's impressive just how much of the original arcade game the various conversions could fit in. The Sharp X68000 is the clear winner, but was hardly a fair comparison due to its sheer amount of power and its actual cost (around £1,000).

Tiertex nevertheless managed to impress Capcom, and soon secured the rights to make a console and computer sequel, 1990's rather disappointing *Strider II*. Interestingly, it starred a brand new Strider called Strider Hinjo, who now sported a gun in addition to his Cypher but could also turn into a laser-spewing robot when engaging bosses. He was otherwise identical to Strider Hiryu, with his own one-man crusade against a new superb villain. Chris Brunning, who worked on the home computer versions, did tell us the reason for the similarities between the two Striders. "The character was the same in the versions we did, just re-coloured," referring to the sprite used in Tiertex's arcade conversions. "That was an internal decision as far as I am aware." He goes on to reveal that there was no involvement from Capcom from a developer point of view, which may explain why it's just not in the same league as the arcade game that inspired it.

This wasn't the first time that Tiertex had made a non-computer sequel to a popular coin-op – *HKM: Human Killing Machine* was a sequel to *Street Fighter* – so we were keen to know if Chris and the rest of the team felt any pressure while working on the home sequel. "Not a great deal," he honestly tells us. "I believe it was only 'cult' popular really."

Strider II went on to receive decent scores on home computers, with the Spectrum version being particularly popular. It's not a good game though, failing to capture the sheer atmosphere that the original game oozed from every pixel. Despite this, Chris feels that Tiertex did get some things right, revealing, "I think it captured the main gameplay elements of *Strider*, the agility."

The Mega Drive, Master System and Game Gear versions came out a little later and were known as *Journey From Darkness: Strider Returns* in the US. Considering the power of the host machines they were all far weaker than the home computer counterparts, let down by clunky controls, drab-looking levels and poor stage design. While Strider Hinjo no longer transforms into a robot, his new shuriken-throwing shenanigans add little to the game and it's little wonder that Capcom conveniently ignores all versions of *Strider II*.

It may have ignored the dull platformer it had allowed US Gold to licence, but Capcom certainly wasn't ignoring the fact that *Strider* still appeared to be popular with gamers. In fact, Capcom was planning a sequel of its own.

Capcom had released *Marvel Vs Capcom: Clash Of Super Heroes* in 1998 and tested the waters by including Strider Hiryu as a prominent playable fighter. Gamers were instantly drawn to the acrobatic ninja, giving Capcom the confidence to continue with its own sequel. It wouldn't be easy however, as Yotsui had long since left Capcom. In fact he'd already made his own spiritual successor to *Strider* in the form of Mitchell Corp's delightfully nutty *Osman*.

Step forward Sho Sakai, who found himself as art director on the highly anticipated sequel, which was first released in arcades in 1999 before being ported to Sony's PlayStation in 2000. *Strider* may have seemingly lost its heart with the departure of Yotsui, but just one play of Capcom's sequel was enough to know that the developer knew exactly what it was doing. "There was naturally lots of pressure," begins Sakai about the challenging sequel, "but I was also deeply honoured to be able to work on the design of the sequel to the legendary *Strider*, which more than compensated for the pressure I felt."

And that pressure was palpable because *Strider*'s fan base is small but incredibly loyal. Sakai definitely felt it, finding himself in the same situation as current developer Double Helix Games. "The [hardest thing was] the need to

satisfy the diehard," Sakai continues. "It was tough to strike the right balance: if you keep things too similar to *Strider* then the seque wouldn't be interesting, but if you change too much then fans would not accept it."

The solution was to effectively remake *Strider*, with the final game featuring two of Strider's original stages and many other elements, including retreads of memorable set pieces and notable bosses such as the bounty hunter Solo and the Kunlang MA Team. The first three levels of Capcom's explosive sequel could be tackled in any order, finishing off with a return to the floating battleship Balrog and another trip to The Third Moon, the base of Grandmaster Meio.

It was all topped off by some amazing new visuals that perfectly captured the spirit of the 1989 original. Although the gaming world was actively embracing 3D technology, Capcom wisely decided to make *Strider* 2.5D, with neat 3D backgrounds giving the game some impressive depth and slick rotation effects. "With the move to 3D backgrounds, we were able to make the levels more than just basic horizontal traversal against a backdrop," explains Sakai about *Strider 2*'s distinctive look. "Some of the enemies were created in 3D as well, so the confluence of 2D and 3D was one of the key aspects of the title."

Another key aspect was ensuring that *Strider 2*'s bosses were just as over-the-top as those found in the arcade original. Capcom's team happily obliged, delivering an impressive menagerie of foes in addition to those returning from *Strider*. Each of *Strider 2*'s stages were divided into smaller sections that typically ended in a boss battle. Memorable encounters include a skirmish with a robotic wooly mammoth, riding along the back of the gigantic Emperor Dragon (an encounter that's replicated in the new *Strider*) and taking out a huge Kraken. "Bosses are an important part of *Strider* for sure, and I think the highly original designs are what makes them so memorable," explains Sakai. "Although many bosses are quickly defeated, they still make a lasting impression, which is quite an amazing accomplishment."

One of the most impressive bosses is Strider Hien, who acts as a suitable nemesis for Hiryu and is unlockable on the PlayStation version. He's the entire creation of Sakai, who revealed the following interesting revelation about him. "In my original design, he wore a long-sleeved top. When I checked the pixel art, though, for some reason he had been drawn without any sleeves at all. Meanwhile, the cut-scene illustrations stayed true to my original design, so his sleeves are intact. Hien is the only character who sports summer and winter wear!"

Hiryu himself arguably remained the star of the show, with Capcom boosting his already powerful moves to make him more like the one-man army that appears in Double Helix Games's sequel and Capcom's *Vs* games. Infinitely faster than his 1989 counterpart, he's now got a variety of useful jumps – including a double jump – for quickly changing direction or propelling himself off walls and a useful boost attack that enables him to launch plasma waves from his Cypher, giving him a fighting chance against Grandmaster Meio's many generals.

Despite being a genuinely thrilling arcade game, *Strider 2* wasn't a success for Capcom, and while it was released across all regions it remains a surprisingly low-key game, which ▶

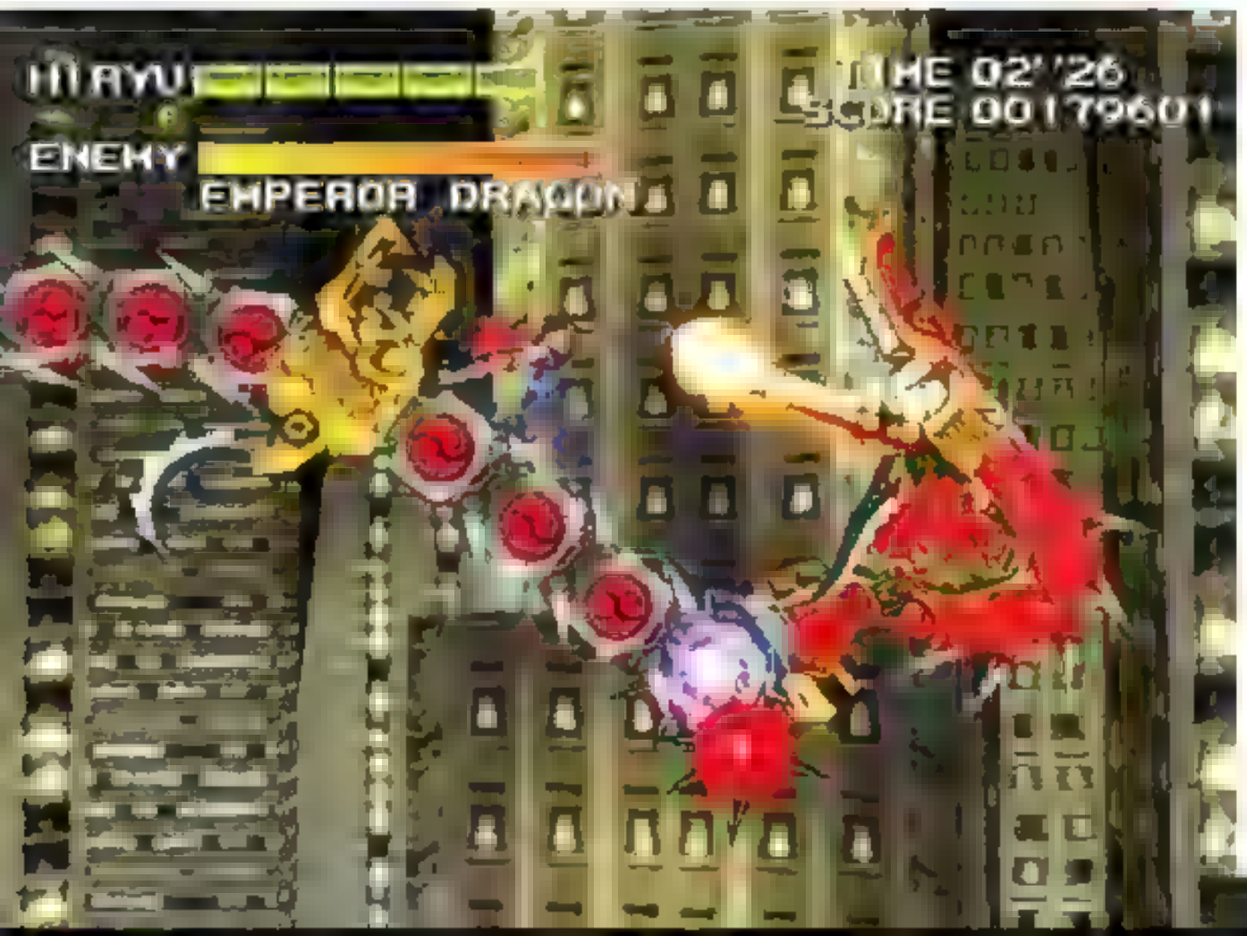
FAN FICTION

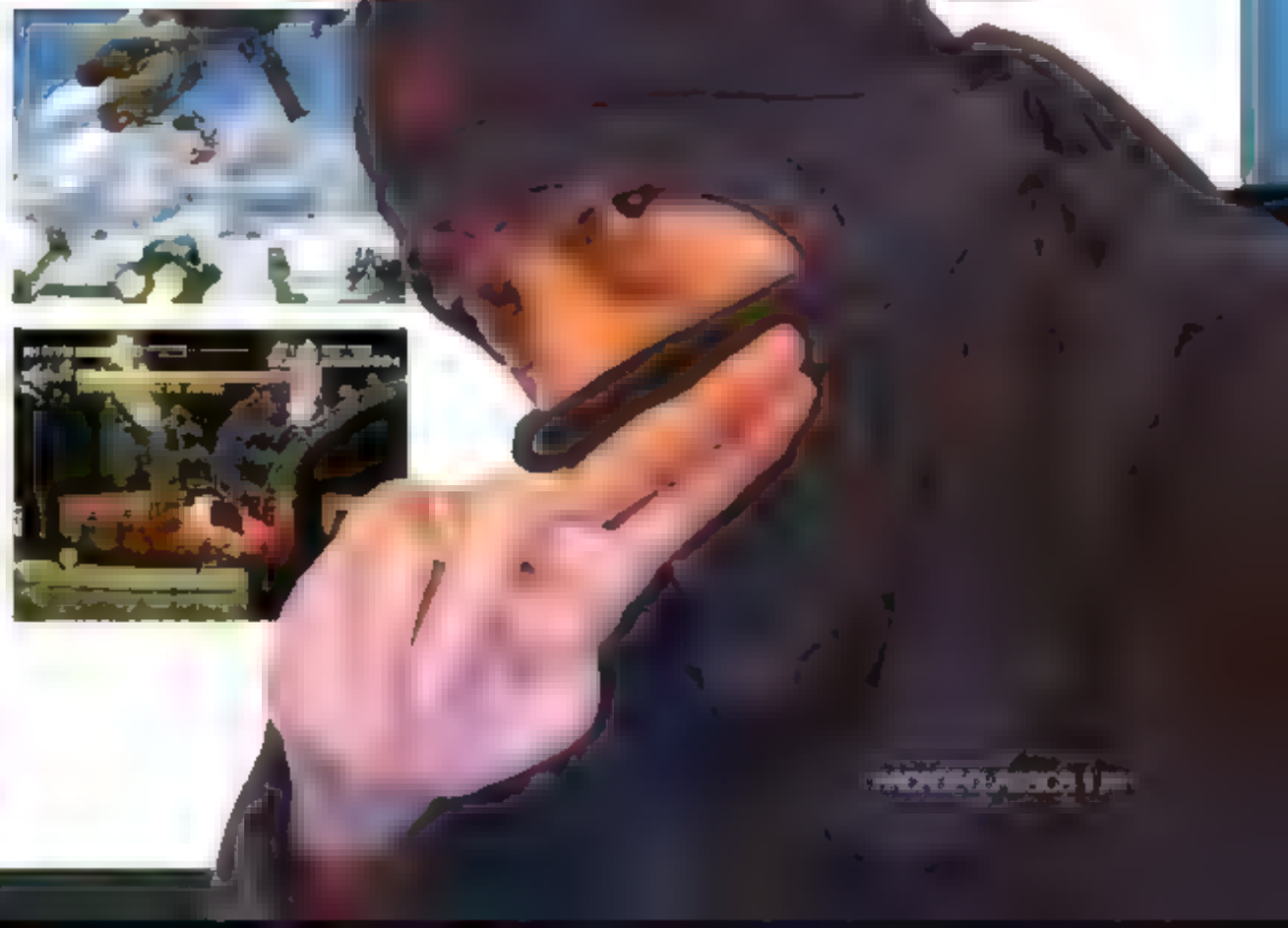
The moment Double Helix knew it had [illegible] its game

We'll admit to be a little concerned after hearing that Double Helix Games would be handling *Strider*'s reboot (although we're happy to be proved wrong). Even we didn't go to the following lengths though.

"Right after the game was announced at Comic-Con we got an email from a *Strider* fan who had dissected the footage of the game found on the web," recalls a bemused Jorge Oaquera. "He sent screenshots of every location in the footage that had the Kazakh star flipped. He included shots from the original game and did side by side comparisons to point out where we went wrong. We always knew that the old-school fans would be the most critical, but that email was a huge reality check for us. Just thinking about the process that this fan went through to make sure we get the details right really inspired us to double down on the details." If you're reading this article *Strider* fan, we'd love to hear what you think of the finished game.

> "I think the highly original designs are what makes them so memorable" – Shio Sakai





THE ULTIMATE NINJA

it's a deadly face-off in classic videogame ninjas do battle

RAIDEN

MOST LIKELY TO: Whinge about his personal life

LEAST LIKELY TO: Star in a proper *Metal Gear* game

NINJA HAMSTER

MOST LIKELY TO: Beat up anthropomorphic rats

LEAST LIKELY TO: Win this ninja

ZOOL

MOST LIKELY TO: Have an identity crisis

LEAST LIKELY TO: Get speedpored by [illegible]

JOE MUSASHI

MOST LIKELY TO: Own a pet dog

LEAST LIKELY TO: Properly train [illegible]

SCORPION

MOST LIKELY TO: Look like a palette swap

LEAST LIKELY TO: Get his own game

STRIDER HIRYU

MOST LIKELY TO: Ride on the back of a brontosaurus

LEAST LIKELY TO: Get another [illegible]

LEONARDO

MOST LIKELY TO: Say something turtley irritating

LEAST LIKELY TO: Become a ninja [illegible]

RYU HAYABUSA

MOST LIKELY TO: Lose his family heirloom

LEAST LIKELY TO: Appear in any [illegible]

ROUND ONE

RAIDEN VS NINJA HAMSTER

■ Ninja hamster or not he's still just a hamster, and Raiden cuts Metal Gears in half before breakfast. Raiden ends the battle by stepping on the hapless hamster before he's even had a chance to squeak.

ZOOL VS JOE MUSASHI

■ Although he's from the Nth Dimension, Zool is actually a pretty rubbish ninja. Joe Musashi easily jumps over the Chupa Chups Zool throws at him, returning fire with deadly lethal shurikens. Silly Zool.

SCORPION VS STRIDER HIRYU

■ "Get over here!" screams Scorpion as he flings his trusty tethered spear in Hiryu's direction. Hiryu effortlessly slides under the incoming weapon and proceeds to slash at Scorpion with his Cypher. Win.

LEONARDO VS RYU HAYABUSA

■ Ryu immediately leaps into action, grabbing Leonardo and pulling off his deadly Izuna Drop. Unfortunately for Hayabusa, cheeky Leonardo simply retracts his head into his shell, leaving Hayabusa with a broken neck.

ROUND TWO

RAIDEN VS JOE MUSASHI

■ Realising the power of his opponent, sneaky Joe Musashi (from the Mega Drive version of *Shadow Dancer*) sets his pet dog on him. Raiden proceeds to bitch about his personal life, causing Joe and his faithful hound to slink off in disgust.

STRIDER HIRYU VS LEONARDO

■ Trained by Splinter, Lee is the strongest of all four turtles. Years of training can't prepare him for Strider Hiryu's awesome skills though. Left shell-shocked, he soon sods off for some much-needed pizza with his brothers.

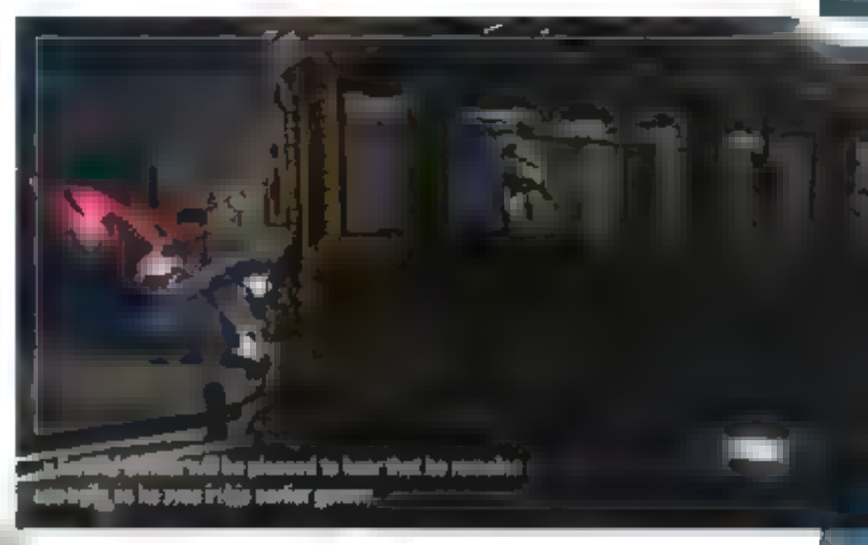
WINNER: STRIDER HIRYU

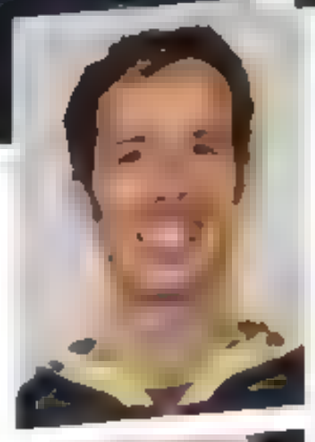
FINAL ROUND

STRIDER HIRYU VS RAIDEN

■ Confident that he won't lose a battle in a box out found in a feature that's entirely dedicated to him, a casual Hiryu wades in. Raiden easily cuts him down in seconds. Did we mention he cuts Metal Gears in half before breakfast?

► Hiryu still has plenty of tricks up his sleeve, as the game powers gradually unlock





It is a pity considering its actual brilliance. Despite his fan base, Hiryu was once again relegated to the sidelines appearing in numerous cameos and the occasional versus fighting game in the intervening years. A *Strider* remake was revealed to have been in the works at Grin Barcelona in 2009, but was quickly cancelled by Capcom at its prototype stage. Grin itself disappeared shortly afterwards and the hope of a new game died with it.

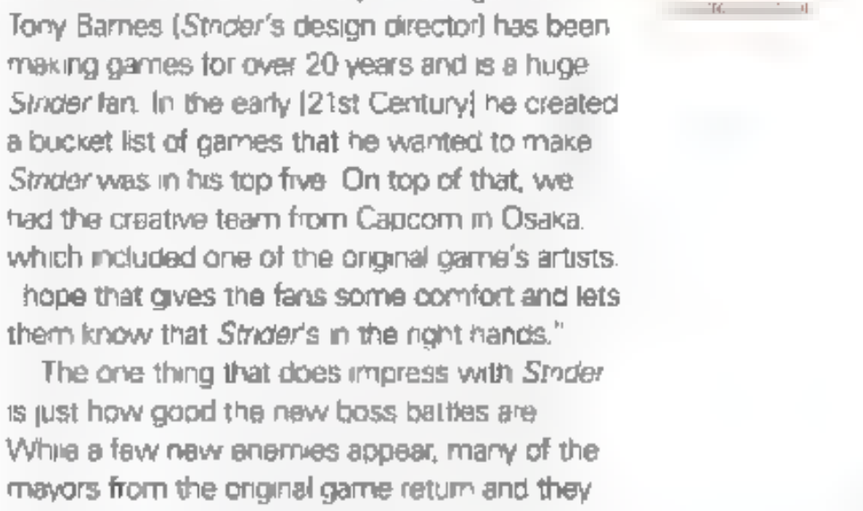
Just four years later however, Capcom used the San Diego Comic Con to announce the trailer of a brand new *Strider* game – to an ecstatic response. As the days passed gamers began to voice concerns due to the previous output of Double Helix Games, but as new information continued to drip out of Capcom HQ, it became clear that the studio did understand the importance of the franchise it had been handed.

"We love the *Strider* fans, both the older generation and the newer generation, and we take all the feedback from them very seriously," assures *Strider*'s producer Jorge Oseguera. "When the game was first announced, we were all very nervous for the reveal. We were confident in the game we were making, but first and foremost we wanted to hear from the *Strider* fans. It was such a relief once the trailer hit the web and the fans had positive things to say about the reboot. I still get goose bumps watching the reaction from the crowd at SDCC when Strider Hiryu first appeared on-screen."

It takes more than a good trailer to make a good *Strider* game however, and the biggest surprise about Double Helix's new *Strider* was that it plays out more like a Metroidvania, meaning the original NES game seems to be as every bit as inspirational as its arcade counterpart. What we've played so far suggests that is plenty of DNA from the original arcade game, but we were still keen to know the reasoning behind the team's new design choices. "We wanted to keep *Strider*'s fast action and fluid gameplay front and centre, but we also wanted to create a much more expansive and immersive backdrop that would support an adventure that takes multiple hours to unfold," admits Jorge. "While I wouldn't say that we are straight up Metroidvania, we're definitely influenced by Metroidvania games, and wanted to marry elements of that sort of non-linear adventure and exploration with *Strider*'s furious Cypher-slashing action."

Regardless of *Strider*'s new game direction, it's all for nothing if Strider Hiryu himself doesn't feel like the titular ninja. After completing the game several times it's clear that Double Helix knows what its doing. The controls feel fluid and precise, Hiryu himself powers through stages, while his repertoire of tricks is extremely impressive. It may not look like a *Strider* game (it's a little too drab-looking for our tastes) but it certainly feels like one. "The first thing we did was to make sure to nail Hiryu's core movement and Cypher-slashing gameplay," reveals Jorge. "We knew that if we couldn't get that perfect, the rest didn't matter. Beyond that, it was all about fleshing out the world and story. We're all fans of the original games so we really wanted to capture the essence of the classics. You'll see familiar themes throughout the levels as well as characters from the previous games. Tony Barnes (*Strider*'s design director) has been making games for over 20 years and is a huge *Strider* fan. In the early [21st Century] he created a bucket list of games that he wanted to make. *Strider* was in his top five. On top of that, we had the creative team from Capcom in Osaka, which included one of the original game's artists. I hope that gives the fans some comfort and lets them know that *Strider*'s in the right hands."

The one thing that does impress with *Strider* is just how good the new boss battles are. While a few new enemies appear, many of the mayors from the original game return and they all put up tough, challenging fights. In short, they act exactly as you'd expect them to and we couldn't be more happy. "Modern technology and an expansive game design have provided the opportunity to update and polish classic boss game mechanics, battle length and pacing,"



beings James. "Solo, the cyborg bounty hunter, for example, has always looked very cool and threatening, but had a limited set of actions and was quickly defeated. In this latest *Strider*, however, he realises his full potential with an arsenal of powerful attacks that will surely test players' skills in an extensive battle. It's been a challenge to update classic bosses, but seeing them do all of these things that you only fantasised about as a child has been very rewarding, not to mention very cool."

James also feels confident that gamers will enjoy the many new abilities that Hiryu now has at his disposal, revealing that the team looked both to the past and present to ensure that their hero still felt like the Strider Hiryu gamers know and love. "When developing the character for this latest *Strider* game, both the recent *Marvel Vs Capcom* and arcade iterations were analysed, and those characteristics which best served the gameplay and visual presentation of the character [were] implemented," he continues. "From a visual perspective, the character has been updated to match the artistic design and HD fidelity of current systems, but maintains the silhouette, colour scheme and key poses and animations of the *Marvel Vs Capcom* series, resulting in a fresh yet recognisable design. The core gameplay rests upon a refined iteration of Strider's bedrock of running, sliding, jumping and climbing, and is infused with actions from the *Marvel Vs Capcom* series as well as an array of new abilities."

Strider was released in 2014 and it proved to be a perfectly acceptable update of the classic franchise, although Capcom currently has no plans for a further sequel. It's a pity, but perhaps understandable. He might not have the legacy of some videogame icons, but there's no denying that the character has touched a lot of gamers in the last 28 years. "From the way he moves to the way he talks, he's the embodiment of cool," concludes James when we ask about Strider's enduring popularity with his fan base. "But it's a coolness born from the original design of the character that isn't necessarily good or evil, and certainly isn't topical or trendy. He's the timeless badass that everyone wishes they could be – that is why it feels so empowering to pick up the controller and become Strider Hiryu." We couldn't agree more. ★

Special thanks to Laura Skelly and Maiko Hinson for making this article possible

BLANK

KABLAMMO! Point Blank burst into arcades in 1994, determined to inject them with some quirky [illegible] trigger-happy fun. We've since lost track of Tilley [illegible] designer Yutaka Kounoe to find out more...

Inexplicably titled *Gun Bullet* in Japan, *Point Blank* offered the unexpected. While most companies were building towards realism, Namco had other ideas. Yutaka Kounoe himself isn't a fan of gore. "I'm not sure it's morally right to make a living through ultra-violent games, but the development department were a little more flexible about designing them," he explains. "However, to make this game appeal to a wider demographic, we held back on the onscreen blood. I wanted to make *Point Blank* attractive to couples on dates, so I made sure there wasn't a drop of blood in any of the debris flying about. Even in *Tekken*, a game we created that allowed you to savour the exhilaration and satisfaction of decimating your opponent, we used CG effects that look like blood, but upon closer inspection, there really isn't any. Actually, the *Point Blank* prototype was a serious game with digitised photographies, in the style of *Lethal Enforcers*, but with Konami and Taito already having hits on the market, it was Namco's preference (and mine) to take on a new challenge. We decided to make a wacky, comical mini-game collection. The finance department didn't see the value in it and said it was no good, but we were determined to work day and night to create a fun game."

Kounoe had just finished working on the rail shooter *Lucky & Wild*, a [illegible]ked-position light gun. The first challenge in *Point Blank*'s development [illegible] repeated experiments [illegible] gun under Tohyama's direct[illegible] the guys were nearly in tears [illegible] frustration. We [illegible]n't get the [illegible]

IN THE KNOW

[illegible]

DEVELOPER:

RELEASED:

PLATFORM:

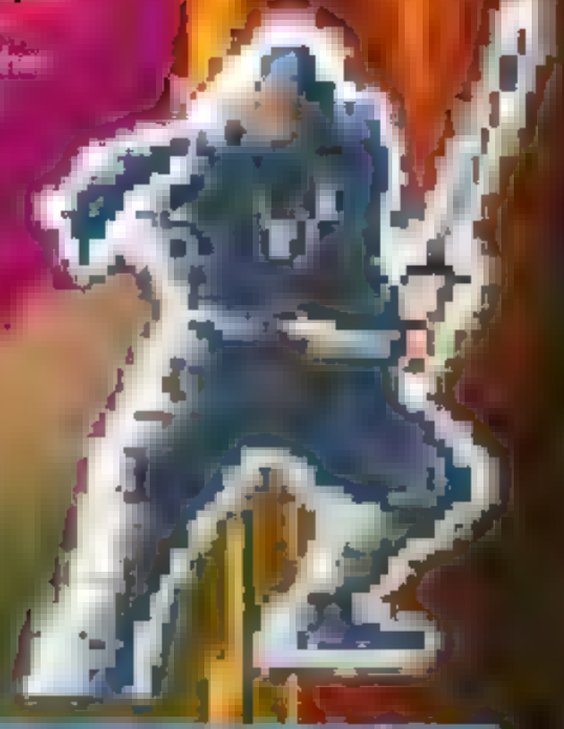
GENRE:

DEVELOPER HIGHLIGHTS

DIG DUG
SYSTEM: ARCADE
YEAR: 1982

LUCKY & WILD (RETURNED)
SYSTEM: ARCADE
YEAR: 1992

TEKKEN
SYSTEM: ARCADE
YEAR: 1994

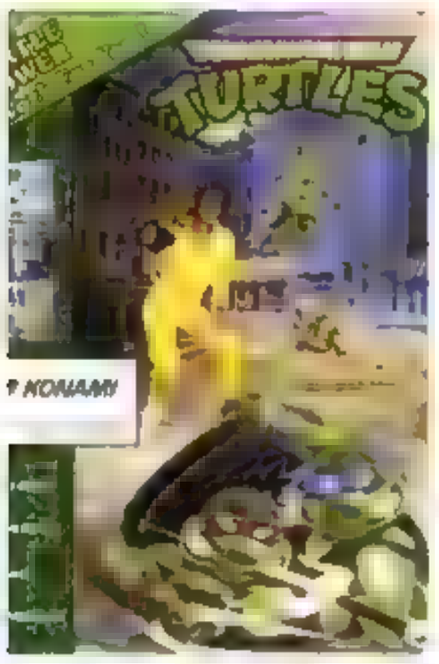


DOCTOR, DOCTOR...

"AT THE BEGINNING of the project we planned ideas by making simple one-page pencil drawings. We had about 60 of these idea sheets lined up so we could consider the variety. On one of them I had written 'Save the old geezer', and that was the start of Dr Don and Dr Dan. They became mascot characters and ended up being painted on the side of the cabinets. The characters' look was decided by gathering ideas from all the designers on the project and holding a contest. I made a rough sketch just to show them my initial ideas for the characters – one round, the other tall and thin. It must have made quite an impression on them, because all of the submitted mascot candidates were almost identical to my original sketch! I wanted them to look like sombrero-wearing Mexican brothers, but the final design was kind of 'safe' – a *Sesame Street*-type odd couple."

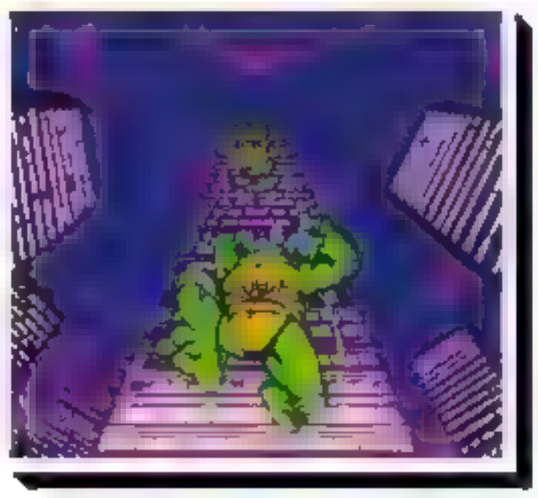
IN THE KNOW

- **Publisher:** Konami
- **Developer:** Konami
- **Released:** 1989
- **Systems:** Arcade, Various
- **Genre:** Scrolling beat-'em-up



Teenage Mutant Ninja Turtles

We take a definitive look back at one of the Eighties' most popular arcade games. Tonight, Martyn Carroll dines on turtle soup



***Teenage Mutant Ninja Turtles* is a perennially popular franchise (and yes, they were indeed 'Ninja Turtles', not mere 'Hero Turtles' – the change of name due to some silly censorship issues in parts of Europe that we'll pretend never happened).** Just when you think it's finally died a death, a new comic, TV series, toy line, videogame or movie reminds us all that those reptilian rapscallions who shout 'Cowabunga!' and scoff pizza have been around for over 25 years, and will probably be around for 25 more.

But no matter how long *TMNT* remains in favour, it will never be more popular that it was in 1990. This was the year when the phenomenon reached its peak and *TMNT* became an unstoppable force. The animated series was playing heavily on TV, the first movie was doing big business at the box office, and the tune 'Turtle Power' by pretend rappers Partners in Kryme was topping charts everywhere. And of course there was the *TMNT* coin-op from Konami, which was released in 1989 but by 1990 was established in arcades the world over.

If you'd been suckered into the *Turtles* craze then it was simply impossible to resist Konami's arcade game. Based on the animated series, it was a scrolling beat-'em-up where you went up against evil Shredder's army of Foot Soldiers and various bosses including Rocksteady, Bebop, Krang and the Shred-head himself. It was slick, fast and fun, with plenty of humour and jokes for fans, yet easily the game's finest feature was its co-op play. Some versions of the cab offered support for four players, allowing you and three mates to each take control of a Turtle and fight together.

The move list was pretty standard for this type of game. Bashing the attack button would result in a simple combo move, with your Turtle performing an impromptu back kick should you be approached from behind. Hitting the jump button followed by attack would perform one of three moves depending on your height: a flying kick (low), a diving kick (mid) or a vertical weapon attack (high). Finally, hitting attack and jump together would unleash your Turtle's special move. Leonardo, Michelangelo and Donatello all performed a sweeping attack capable of defeating multiple enemies with a single blow, while Raphael was blessed with a unique roll-and-kick combo that was useful against some bosses.

Despite the Turtles being faster than their foes and boasting powerful specials, the game has earned a reputation as a contemptible coin muncher. It's true that the later bosses can be a fairly cheap, but they're certainly not invincible. In our experience, at the height of the game's popularity, players were always eager to pump in extras credits and continue, or buy-in and help out their buddies – surely a clear indicator that Konami had produced a winning coin-op that delighted both players and operators.

Konami must have been pretty pleased with the game too. Having already experienced huge success with its first *TMNT* outing – a platform/adventure game developed initially for the NES – the company wasted no time in bringing the arcade game home. It developed a well-received NES conversion, which expanded on the coin-op by adding a couple of exclusive new levels. Home computer rights, meanwhile, went to Brit publisher Mirrorsoft, which commissioned Probe to convert the coin-op to the Spectrum, Amstrad CPC, Commodore 64, Amiga, Atari ST and PC in 1991. Like a lot of arcade conversions, these releases suffered from single-fire-button syndrome, where players had to clumsily push up and fire to jump.

In recent years, the arcade game has popped out of its shell on a couple of occasions. It was included as an unlockable extra in the 2004 game *TMNT 2: Battle Nexus*, and was probably the best thing about it. In 2007, Ubisoft put the coin-op out on Xbox Live Arcade complete with Achievements and a co-op mode. If you're an X360 owner looking for a nostalgia trip, 400 MS points is a small price to pay to party like it's 1990 ★

the expert

Until recently, Patrick Wheeler held the Twin Galaxies' TMNT high score with a haul of 1,085 points. We find out the story behind the score and why he has no plans to reclaim the record...

PROFILE

- **Name:** Patrick Wheeler
- **Age:** 30
- **Location:** Diboll, Texas
- **Key Twin Galaxies**
  - [redacted]
  - Metal Slug 3 [Arcade]
  - 10,213,610 points
  - Sunset Riders [Arcade]
  - 1,010,930 points
  - Jailbreak [Arcade]
  - 9,999,900 points

■ Can you tell us how long you've actually be gaming for and what you like about it?
The past 22 years, starting with the NES at age seven. I credit games like *Battletoads*, *Contra*, *Life Force* and *Punch-Out!!* for giving me the skills necessary to compete at a higher level.

■ When and where did you first play *TMNT* and what were your initial impressions of the game?
I remember playing the game at a bowling alley when I was around ten years old. At the time I thought it was one of the most fun games I had ever played, because it was different from the typical platforming and shooting games that were common on game consoles during that time.

■ Why did you decide to have a [redacted] at taking on the Twin Galaxies high score? Were you confident you could beat it?
Another *TMNT* player offered a bounty on the Twin Galaxies forum in 2008 and, since I already knew the game inside and out, it was an easy cash-in.

■ Is your 1,085 score the one you claimed the bounty with, or did you do it with a lower score, and then build on it later?
There was a bit of drama. I made a recording to claim the bounty – finished the game with a score of 555, with no leeching – and sent it to him. He accused me of cheating, so I then submitted the recording to Twin Galaxies for verification, and it was verified as legit. About three weeks after that, a higher score from a third player was verified and this one was full of boomerang leeching. So, the next day – 12 January, 2009 – I recorded a new score of 1,085, which was basically the same as my previous one, but with added boomerang leeching. I didn't submit it because I don't agree that boomerang leeching is a legitimate tactic that should be allowed. However later that year the same person who offered the original bounty took first place, so I decided to submit my, at the time, seven-month-old score. I did this because none of the other players could finish the game, and I didn't feel that their recordings were actually worthy of first place.

■ Can you explain to us what you mean by 'leeching'?
It's possible to gain an infinite number of points by hitting the projectiles that enemies throw at you, as each one is worth one point. Doing this excessively would disqualify the recording though. [The Twin Galaxies rules for the game state: "While some leeching is permitted in regards to opportunities against certain bosses (50 points maximum) too much will result in your score being disqualified."]

■ In April 2011, a new top score of 1,311 points by Saulo Bastos was verified by TG. Will you try and reclaim the record?
No, I won't. I've already finished the game many times, and seen everything there is to see. The only thing that could possibly be left to do is find an obscure point-pressing technique to exploit, but I have no interest in doing that.

■ Is it easier, or more difficult, to get a high score when playing with other players on a game like *Turtles*?
It's more difficult to score highly when playing with other players for two reasons: there are less enemies for each individual player to defeat, and it's harder to manipulate the movements and actions of each enemy because an enemy's focus tends to change from one player to another.

» Things can get pretty frantic when all four Turtles are in play.

» Hit fire hydrants to blast enemies with water.

Perils and Pitfalls

You'll have to beat these bosses to total the Technodrome!

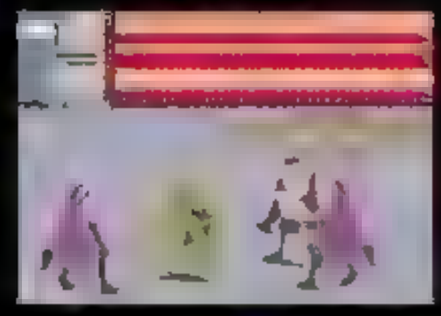
Rocksteady
An early boss in many *TMNT* games. Move up and down to dodge his gunfire, and jump to avoid his running charge.

Bebop
Similar to Rocksteady, only slightly more powerful. Attack at close range, then quickly jump away before he retaliates.

General Traag
Having previously defeated Granitor, you must face his formidable boss. He's pretty slow so keep moving around the screen.

Krang
The toughest boss in the game. Use flying kicks where you can, or if you're playing as Raphael, spam his special move.

Shredder
The chief adversary tries to confuse you with clones. Just keep plugging away with your combos and specials until he falls.



» When Rocksteady and Bebop charge, jump out of the way and they'll smash skulls. The dolts.

■ Tell us briefly about your MAME setup. What's it like?

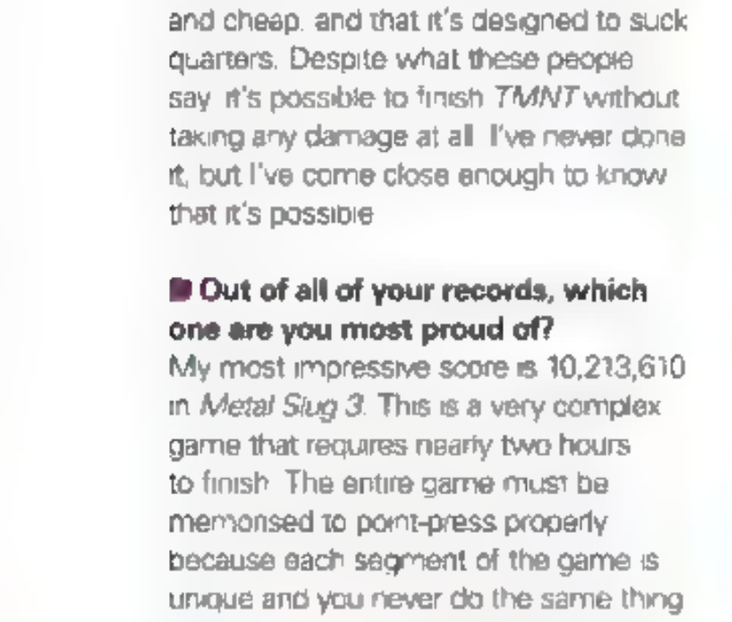
I use my PC with a PlayStation 2 DualShock controller attached through a USB adapter

■ How do you think the game holds up 20 years on?

I think it holds up well. The graphics are colourful and detailed, control is accurate, and it's the perfect length for this type of game. Most of the reviews say it's unfair and cheap, and that it's designed to suck quarters. Despite what these people say, it's possible to finish *TMNT* without taking any damage at all. I've never done it, but I've come close enough to know that it's possible

■ Out of all of your records, which one are you most proud of?

My most impressive score is 10,213,610 in *Metal Slug 3*. This is a very complex game that requires nearly two hours to finish. The entire game must be memorised to point-press properly because each segment of the game is unique and you never do the same thing twice. It took me 300 hours over a period of seven months to finally break the 10 million mark, and the feeling of satisfaction after doing that was incredible. ★



» The skateboarding stage is not as tricky as it first appears, as it's more about dodging than attacking.

PATRICK'S SURVIVAL GUIDE

Useful tricks to help you freak the Foot Soldiers

1 ■ DO IT WITH DON

Use Donatello. It's much easier to finish the game on one credit with him due to his long attack range. It's possible to finish with one of the other Turtles, but it's considerably harder, especially against certain bosses.

2 ■ POINT TAKEN

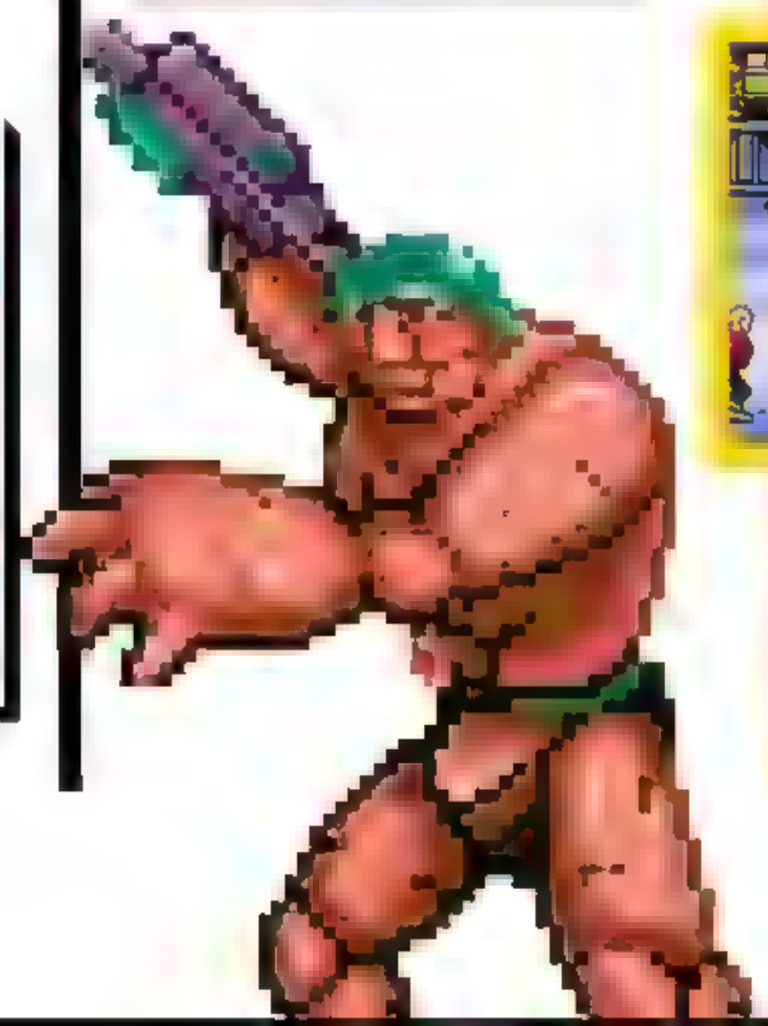
Hit the rope that the robots throw towards you. Every hit is worth one point even though it doesn't actually damage the enemy. Also, hit the boomerangs that enemies throw at you. They're worth one point each too.

3 ■ KEY POSITION

Your character has more vertical range than the enemies, so use it to your advantage. The best way to handle an enemy is to move above or below them, then stop moving and time your attacks to hit them as they move up/down to approach you.

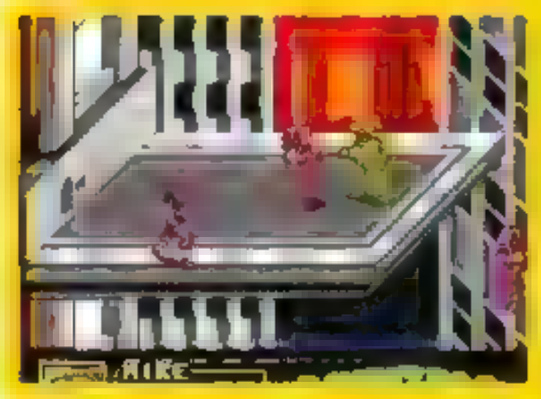
4 ■ INCH FORWARD

To avoid being mobbed by enemies, advance through the levels gradually. By inching your way forward, you usually spawn one or two enemies at a time, which makes the game a lot easier.



the sequels

Of the many Turtles games, these ones stay true to the original coin-op



TMNT III: The Manhattan Project

Released: 1991

The NES already had its own *Turtles* game, so the coin-op was released on the Nintendo console as *TMNT III: The Arcade Game*. This game then, from Konami, was a NES-exclusive sequel to the coin-op that was essentially an extra set of levels rather than a full-blown follow-up. The main difference was that each Turtle had their own special move. These were almost too powerful, particularly against the bosses, so to prevent the game from being a walkover you lost a little energy each time you used one. Overall, it was a fun yet derivative continuation of the coin-op. Note that there was a 1992 PC game called *TMNT Manhattan Missions* but it has nothing to do with this game, being more of an adventure game with fighting elements

TMNT: Turtles In Time

Released: 1991

This was the true sequel to the *TMNT* coin-op. The visuals were slicker (some lovely sprite-scaling effects were added), the action was faster and more frantic, the Turtles were blessed with new moves (included a run and shoulder barge), and everything was tuned to perfection, resulting in one of the best beat-'em-ups to grace the arcades. Home versions followed, with the SNES version renamed *TMNT IV* to remain consistent. The Mega Drive version was titled *TMNT: The Hyperstone Heist* and featured different stages. More recently, the game was given a graphical makeover and released for X360/PS3 as *Turtles In Time Re-Shelled*.

TMNT

Released: 2007

The Turtles returned to cinemas in 2007 and Ubisoft was on hand to create games based on the CGI movie. Every platform received a generic tie-in except for the Game Boy Advance, which was treated to this delightful scrolling beat-'em-up. The game introduced a few RPG-lite elements, but thankfully they didn't detract from what was essentially a straight-up, old-school brawlathon. The graphics were great too, making this one tutle to track down and cherish. In 2009, Ubisoft released a game for the Nintendo DS called *TMNT: Arcade Attack*, which failed to recaptured the nostalgia of the Konami coin-ops anywhere near as well as this GBA offering.

the machine

Pride of place in James Dinndorf's games room is a four-player TMNT coin-op. Here, he reveals how he transformed an old Desert Assault cab into his most wanted machine

"I'm 27 and from St. Cloud, Minnesota. Since I was a kid, I thought it would be really cool to own an arcade machine. Growing up in the Eighties, there are many that I have fond memories of but the first one that comes to mind is *TMNT*. This game was a revelation at the time, and was at the top of my want list even before I got into the hobby.

"In 2004, the owner of an old roller-skating rink told me he had a few games to sell. He showed me a few machines, but it didn't take me long to notice a large four-player *Desert Assault* game. The game itself didn't interest me, but it had my attention because the cabinet was identical to the four-player Konami cabinets that *TMNT* came in. The game worked fine and the cabinet was in excellent shape, which was crucial to me since it meant that the power supply, monitor and wiring all worked. I handed the owner $400 and loaded the game into my friend's truck.

"I'm very pleased with how well my *TMNT* turned out. It's one of my favourites in my collection. I get a kick out of playing it with my friends and reminiscing about the old arcade days. It's like reliving a part of my childhood."

CONTROLS

The control panel was one of the more difficult tasks during this project. I began by removing the old joysticks and buttons, followed by the control panel overlay. I found a nice NOS *TMNT* overlay and discovered that the holes for the joysticks and buttons did not match the old holes. I drilled new holes, which was tricky since some of the new holes overlapped with the old ones. After some very tedious hours, it turned out very well. *TMNT* originally used leaf joysticks, but I decided to opt for microswitch joysticks. The leaf joysticks are difficult to find, and in my experience they're not as accurate as microswitch joysticks, particularly the diagonal directions.

ARTWORK

Having good side art was extremely important to me since it's one of the most iconic elements of the *TMNT* cabinet. I was able to find a company that produced nice quality reproduction side art. It came as two giant adhesive sheets that had to be cut to fit the cabinet's dimensions.

CABINET

The cabinet is in great shape. After the old artwork was removed, it was lightly sanded and repainted. I've since repainted the front of the cabinet and coin door as well. The wood is still in excellent shape, with no noticeable damage

PCB

I found a working *TMNT* PCB on the internet. Since *TMNT* is a four-player game and of the JAMMA standard, it uses separate wiring harnesses for the third and fourth player controls. I ended up finding those harnesses through the KLOV forums and, after a little soldering, everything wired up nicely. I've recently acquired a *Turtles In Time* PCB and am in the process of constructing a JAMMA switcher that will allow me to run both *TMNT* games in the same cabinet.

MONITOR

The monitor was the only part in need of some serious work. The colours were washed out and the picture was warped a little and over-stretched. I opted to go for a new monitor. I bought a 25-inch monitor from a company that builds arcade monitors using a universal chassis and a good TV tube. It worked flawlessly and looked 100 times better than the original monitor

COIN MECH

Original *TMNT* machines used a dual coin door layout. However, this cabinet used a single door with four slots, which I actually like more. I decided to customise the coin slots by adding colour-coated coin slot inserts that correlate to each player's colour. I think it adds a nice touch and it's one of my favourite components of the machine

developer Q&A

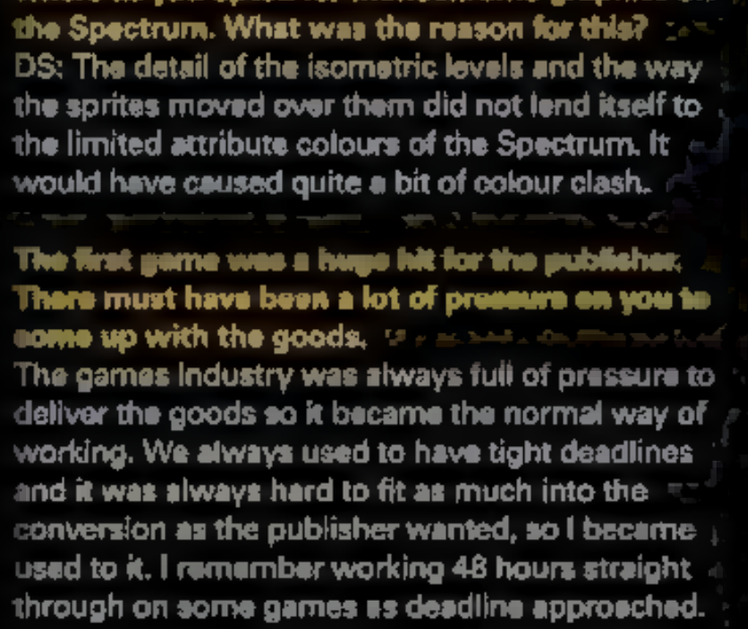
We speak to Dave Semmens, the man behind the Spectrum and Amstrad CPC versions of Teenage Mutant Ninja Turtles

Tell us when were you bitten by the programming bug?
I had a ZX Spectrum and had a dabble at BASIC but thought that there must be a better way of coding for it. I bought a Z80 assembler and taught myself to code on evenings and weekends. I was a school kid at the time.

How did you get the *TMNT* job?
I was offered the contract as Probe could convert to most platforms but really struggled to find someone to take on the Spectrum and Amstrad CPC versions.

Did you have access to the coin-op machine during development?
I travelled down to the south coast to play the coin-op. I took my artist with me and we had a day on the machine. We also had an end-to-end video of the game. It was not uncommon in the early days to do conversions after a quick play of the game and then only having photos of the screens.

How long did the conversion take, and what do you remember as being the most challenging aspects of it?
It normally took a couple of months to code a game. Programmers had their own libraries of sprite routines and scrolling routines so it was a straightforward job to get the bulk of the work done. The challenge on this game was the isometric view of the levels. I had only worked in 2D previously and this game needed X, Y and Z. The Turtles could move in and out of the screen and jump onto different height sections so it all took some working out. The other challenge was how to store all the graphics for each level. The answer was to split the sprites up into component parts so that the Turtles used the same body parts but I overlaid their individual weapons on top. The baddies also reused body parts (legs, body and heads) and this saved enough memory to fit it all in.



The first *Turtles* game was a full-colour affair, where as you opted for monochrome graphics on the Spectrum. What was the reason for this?
DS: The detail of the isometric levels and the way the sprites moved over them did not lend itself to the limited attribute colours of the Spectrum. It would have caused quite a bit of colour clash.

The first game was a huge hit for the publisher. There must have been a lot of pressure on you to come up with the goods.
The games industry was always full of pressure to deliver the goods so it became the normal way of working. We always used to have tight deadlines and it was always hard to fit as much into the conversion as the publisher wanted, so I became used to it. I remember working 48 hours straight through on some games as deadline approached. Thank God I was young, as it would probably kill me now.

Were you happy with the end result?
I was very happy with the way the game played, and we fitted all the levels in and delivered on time. That's fine by me.

Did you remain in the games industry, and what are you up to these days?
I moved onto other games and other systems including ST, Amiga, PC, Game Gear, Master System, then onto the newer home systems. I left the industry around five years ago. I had moved from programmer to senior to lead and then into team management as a producer. Finally I became development director at Acclaim in Cheltenham. Unfortunately, a third redundancy opened my eyes to the fact that it was time to find something more stable.

I currently work as a project manager for a company in Sheffield. I still have some good friends that live the games development dream, but I'm happy with my life as it is now.

developer Q&A

Martin Bysh reveals why the 16-bit versions were sadly lacking

How did you end up with the job of converting *Teenage Mutant Ninja Turtles* to the Atari ST and Amiga?
After completing *Viz* for Probe Software they offered me *Turtles*. It looked like a straightforward conversion so I accepted.

Did you work alongside Hugh Riley (graphics) and Jeroen Tel (music), or was everything done remotely?
I never met or even spoke to Hugh or Jeroen. Everything was supplied by Probe. This was typical of the Probe method.

Were the ST and Amiga versions developed simultaneously, or one after the other?
One after the other. I can't remember which I did first, but my preference would have been for the ST as that would have presented the most problems. Porting a game from ST to Amiga could take as little as a couple of weeks, whereas porting from superior hardware down would always present problems. I had specialised in such ports prior to *Viz* and *TMNT*, converting games from one to the other, often in as little as a week.

How long did it take to complete the job?
I can't remember exactly how long the development took, but it overran considerably. We ran into problems on certain Amiga 1000s with the unusual Amiga compressed disk format we were using.

Did Probe monitor your progress and give you feedback as the development progressed?
Probe monitored progress, but not at strict intervals. The industry was beginning to mature at that point, but it was still pretty informal. The job of producer eventually emerged to bring order, but it was quite a recent addition to the games industry then. And the average producer's lack of technical knowledge and experience, combined with the independent character of the invariably self-taught programmers, artists and musicians, left them as little more than glorified messengers, passing notes between us.

How pleased were you with the finished product?
MB: Not very. This was the 13th game I'd published without rest, and I'd begun to tire of the process, which was reflected in the final product. The Probe system, while very lucrative for them, was not enjoyable for a developer. Previously I'd had much more control over products, managing the graphics and sound, or even taking a product to beta before selling it. Creating Probe games felt as dull and uncreative as the quick Amiga-ST ports I'd been doing, but whereas the ports took a couple of very well-paid weeks, *Turtles* took many months. I'd say that *Turtles* was one of the main drivers for me leaving the industry and going to university. I returned to it after uni, but by then it had become big business and after managing a large team of developers for a film tie-in, I left it about 12 years ago. With the exception of *TMNT*, it was fun while it lasted.

the conversions

We reveal the home conversions that were totally awesome, or left you feeling shell-shocked

01. NES (Best Version)

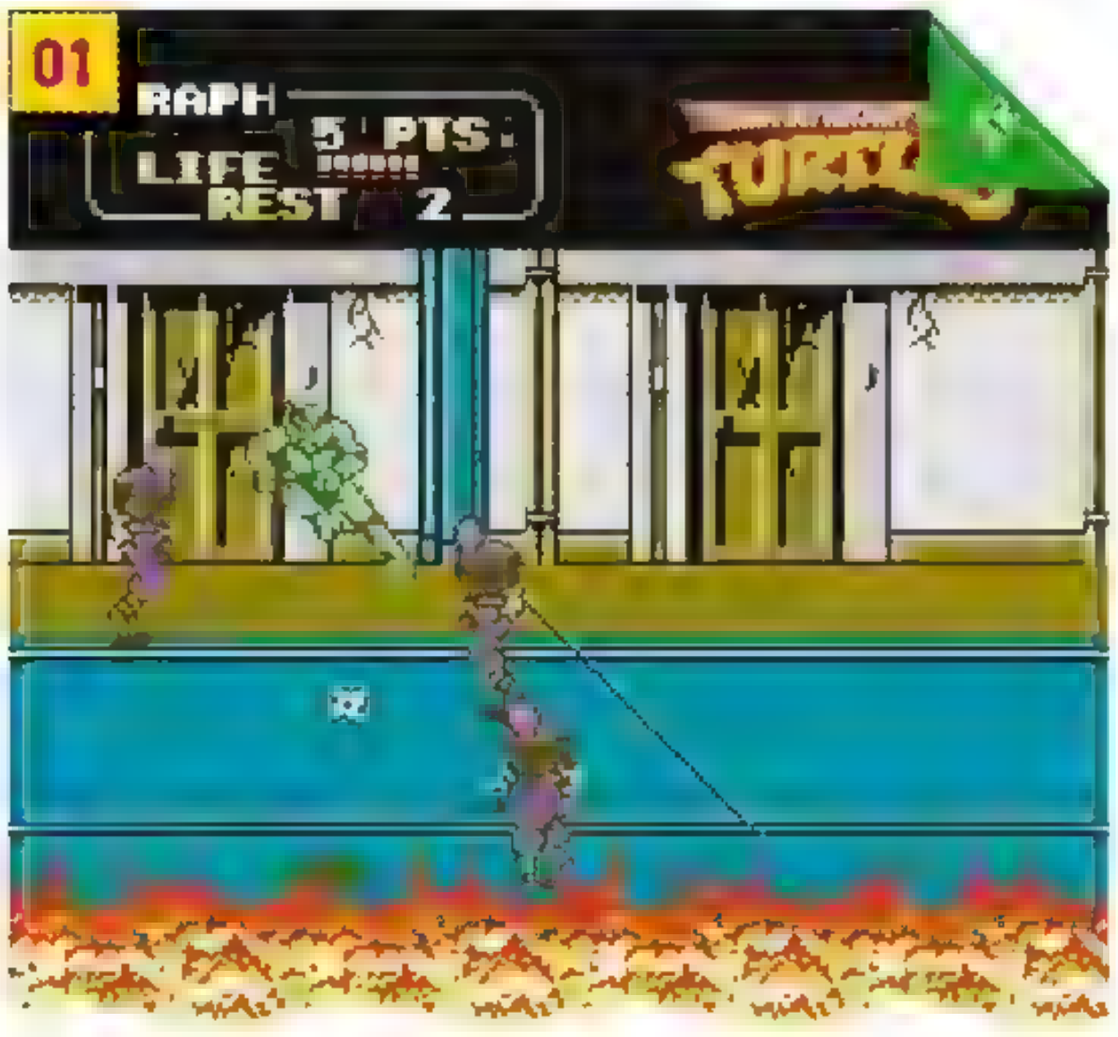
Bar the arcade-perfect Xbox Live Arcade version, we think the NES offering is the best port of Konami's arcade game. It looks the part with bright colourful visuals and well animated sprites, and also plays the part with solid collision detection and authentic recreations of the original levels. Like the other home versions, it loses out due to the lack of four-player support, but it does make up for this oversight with the inclusion of two additional exclusive levels and greatly extended levels from the arcade original. A few changes are made to the boss roster (the end battle against Bebop and Rocksteady now has you fighting Baxter Stockman), but this is an otherwise excellent port.

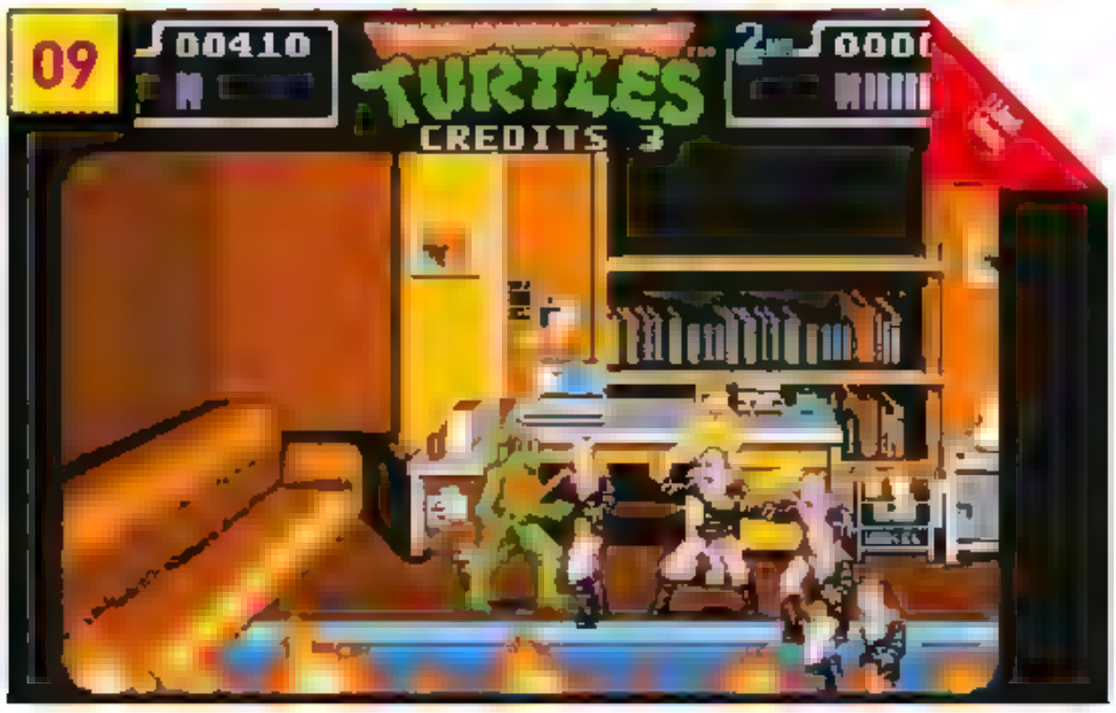
02. Amstrad CPC

All the 8-bit computer ports are of a very high standard, but our favourite is easily the CPC offering. For starters it looks glorious, with bright, cartoony visuals, excellent animation and shock horror – genuinely decent scrolling. Probe were masters at getting the best out of Lord Sugar's machine, and *Teenage Mutant Hero Turtles: The Coin-Op* was no exception. Like the other 8-bit ports it lacks the killer pace and constant assault of enemies that the original coin-op offered, but this is still an excellent port that even non-CPC owners will appreciate.

03. Commodore 64

The C64 version isn't quite as good as the Amstrad offering, but





we still had a lot of fun with it. The colour scheme may not be as nifty as the CPC game, and the sprites are a lot smaller, but they remain perfectly formed and well animated. The backgrounds are of a very high standard, while the collision detection is very similar to the Amstrad offering, and a darn sight better than the ropey 16-bit offerings. It again suffers from a lack of pace and urgency, but this is mainly down to the fact that so few enemies (typically three) are ever on-screen, meaning it never feels as exciting to play as Konami's coin-op. Despite these issues, the Commodore 64 version is another worthy conversion that fans of the arcade original will still enjoy.

04. Atari ST

In some ways the Atari ST port is extremely similar to Probe's woeful Amiga offering. It's redeemed by a number of important differences though. The scrolling, while far from perfect, isn't as juddery as the Amiga offering, and there is a decent representation of the original theme tune playing along in the background. Collision detection is also slightly better that its Amiga counterpart, although it still doesn't feel as tight as the 8-bit games. It's far from perfect, and falls short of the superior 8-bit offerings, but it's a rare triumph for the Atari ST which typically flailed behind Commodore's Amiga when it came to conversions.

05. ZX Spectrum

The Spectrum conversion of *Teenage Mutant Ninja Turtles* is another slick port, and further testament to Probe's coding skills. Unlike its peers, the Spectrum offering is in monochrome, lacking the colourful visuals that work so well on the Amstrad and C64 versions. Luckily the Speccy offering has some great detail in its large sprites, meaning it still manages to capture the humour and larger-than-life appeal of Konami's original coin-op. Collision detection is very good, while Probe has done a good job of trying to capture all the elements of the arcade game. There are often more enemies on-screen than the other 8-bit versions, meaning that it's a little more frenetic than the Amstrad and C64 offerings.

06. PC

Teenage Mutant Ninja Turtles on the PC suffers from all the same problems that were an issue on the other 16-bit computers. It's better than the Amiga version, but on a par with the Atari ST offering. Like the other home versions it lacks the four-player support found in the original arcade game, but the two-player action is fast-paced and helped along by the sheer number of enemies that constantly attack you. It's probably our favourite version out of all the 16-bit offerings, but it's still a disappointment – more so when you put it up against the superior 8-bit versions and the fun NES game.

07. Xbox Live Arcade

Unsurprisingly, the Xbox Live Arcade version of *Teenage Mutant Ninja Turtles* was an exact port of the arcade original. Ported by conversion kings Digital Eclipse, it featured all the levels from the original arcade game, and also boasted online play, enabling you to play with up to three other people online. Released to tie in with the 2007 movie, the character screen tied in with the style of the characters in the film, but it was an otherwise perfect port and a steal at just 800 points. Sadly, the game is no longer on sale, so if you missed it on its original release, you're now out of luck.

08. GameCube/ Xbox/ PS2

The worst thing about this port of *Teenage Mutant Ninja Turtles* was that you had to endure playing the decidedly average *Teenage Mutant Ninja Turtles 2: Battle Nexus* in order to unlock it. Once unlocked, it revealed itself to be an extremely authentic port of the arcade original. The only differences were some alterations to the music and the loss of many of the voice clips, presumably because Ubisoft didn't have the rights to use them.

09. Commodore Amiga (Worst Version)

Amazingly, the Amiga version of *Teenage Mutant Ninja Turtles* is extremely poor when compared to its 8-bit peers. The scrolling throughout is very jerky and off-putting, while the animation is also stiff and stilting, lacking the smooth-flowing visuals of the arcade game. It earns additional points for having far more on-screen enemies than the 8-bit games, but this simply highlights the poor collision that the Amiga port suffers from. It also lacks the extended and additional levels that were found in the NES game, making the whole thing a massive disappointment for fans of the arcade game. The final nail in the coffin was a complete lack of music in the game and extremely weedy sound effects. A disappointingly bland port that could have been a lot better.

Asteroids

SHOOT SOMETHING SHOOT AGAIN

- ATARI INC
- ARCADE
- 1979

Ed Logg is a genius. When he worked at Atari he was involved in a huge number of hit games for the company from Space Breakout to Gauntlet and Centipede. One of his most memorable achievements, however, is this incredible shooter from 1979, which he designed alongside Lyle Rains and Dominic Walsh.

As with many arcade games of the golden period, the concept of Asteroids is simple: shoot down as many alien ships as possible. Of course, while the idea is simplistic, the gameplay is anything but. Asteroids appear on screen and you shoot them down. As they are shot they break into smaller pieces, meaning there is a higher chance of colliding with smaller debris.

Your ship is far from defenceless, equipped with a thruster, but this must be managed carefully as it takes a while to slow down, meaning it is all too easy to fly into an errant asteroid. As more pieces fill the screen, the game speeds up, forcing you to find a safe place. You can send your ship into hyperspace, which may get you out of the way of an incoming rock, but the more you use it, the more likely you'll have to deal with an asteroid where you don't want it.

Add a couple of highly accurate flying saucers that appear at certain stages to worry you along, and Asteroids is a game like no other. Every game plays out differently, meaning it is always fresh and exciting. Although it received several ports and sequels in the years that followed, nothing is as good as the original. A true arcade classic.

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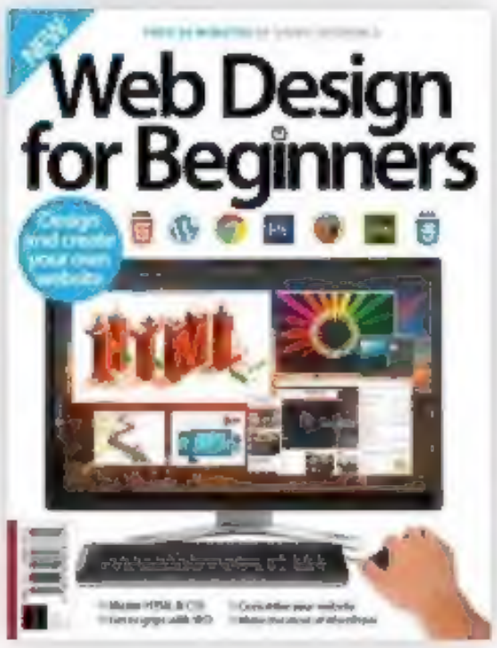

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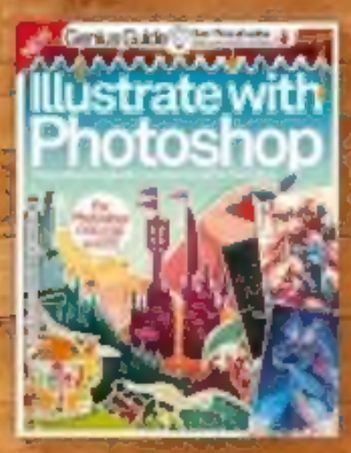

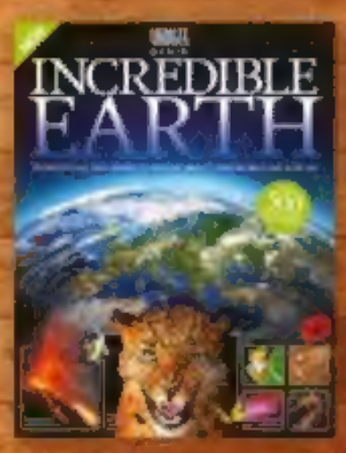

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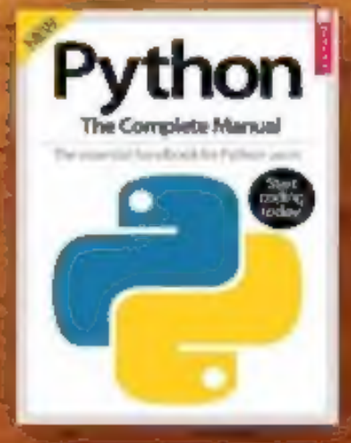

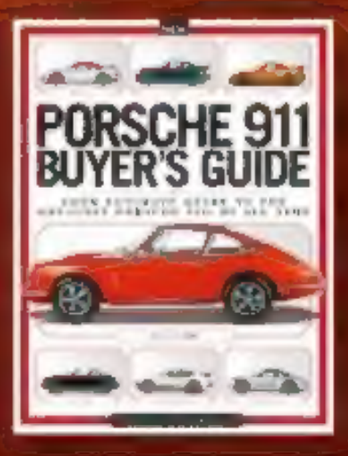

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